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Aeroplane

Volume 38

Part 1

1930

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THE AEROPLANE

6d. Weekly.

INCORPORATING AERONAUTICAL ENGINEERING

Edited by C.G.Grey

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JAN. 1, 1930.

THE AEROPLANE

Incorporating

Aeronautical Engineering

VOL. XXXVIII No. 1.

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ON BRITISH PROGRESS IN 1929.—I.

This being the first of the New Year the time seems fitting for a review of the progress which has been made by British Aircraft Constructors and by British Aero-Engine Builders in the past year. So herewith is presented the first instalment of this review. One hopes that it will go far to convince our brethren over-seas that the British Aeronautical Engineer, like British Engineers in all trades, can when opportunity arises turn out the finest engineering jobs in the World.

Perhaps one may be forgiven for claiming to be better qualified than most people to produce an impartial review of our progress. On the one hand, having a fair knowledge of what is being built in all other countries where aircraft are produced, one is not prevented by the excellence of our products from judging them in comparison with those of other nations. And, on the other hand, having known every firm in the British Aircraft Industry quite intimately ever since the earliest of them began in 1908, one is able to keep tab, so to speak, on their progress year by year.

Our Prime Achievements.

Certainly the year 1929 is one of which we have good reason to be proud. In the first place we have beaten the most coveted of all records, that for Absolute Speed irrespective of class or conditions, by such a margin that there is no arguing about our superiority. And in doing so we have for the first time in history produced a vehicle which has travelled at six miles a minute.

Secondly, though we did not actually beat the record for Absolute Distance, we did at any rate produce an aeroplane which would have done so but for sheer bad luck in meeting an inopportune adverse wind. And in this flight our pilots made the first non-stop flight from England (or any part of Europe) to India.

Thirdly, though we did not beat the record for Absolute Height, and did not in fact try to beat it, the Height Record was beaten by a foreign machine with a British Engine. And that comes as near as no matter to placing the record to our credit.

Therefore, as the performance of any aircraft and its power-plant is judged by its speed, its range, and its climb, we seem to be well ahead of the rest of the World.

Given that a machine's performance-figures are good, its value thereafter must be judged by the quality of its material and workmanship. For, remember, high performance *can* be got out of an aeroplane which is badly built of bad material,—and sometimes high speed or long range or great height has been reached merely because the aircraft used has been dangerously light according to our standards as laid down by our Air Ministry. So, when a British aircraft does put up an unusually fine performance the World knows that it has done so under a certain handicap of weight, to give the required strength, from which the aircraft of other nations are free.

Also, there is the fact that, where our commercial aircraft are concerned, the actual flying tests which the Air Ministry demands are more severe than those which the International Convention of 1919 agreed as being adequate. Consequently when our civil aeroplanes qualify for the British Airworthiness Certificate they have not only to be stronger than foreign competitors, but have to put up a better performance in spite of the extra weight. One of the leading men in the Aircraft Industry deals with this point in the "Commercial Aeronautics" Section this week.

"WE MUST BEAT THE IRON WHILE IT IS HOT; BUT WE MAY POLISH IT AT LEISURE."—Dryden.

DIGGING IN.—The photograph shows Mr. Frederick C. R. Jaques, of 29, Charlbury Road, Walkerville, South Australia, and his Avian. Jaque's Flying Services are flying instructors, aircraft operators, aeronautical engineers and consultants, and also run air taxis and do air photography. Thus does enterprise in our Overseas Dominion prepare for good times to come.

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OUR WORKMANSHIP.

All over the World, whenever workmanship is being discussed, British workmanship is the standard by which it is judged. In all manufactured products the same thing holds.

American goods may have more outside polish than ours and may be of quite good material, and they may work quite well. But their details are apt to be crude, and bits are apt to come unput at awkward moments.

French and Italian goods may be prettier to the eye, for the artist-artisan is very much a Mediterranean product. But—as an experienced pilot said some years ago—although a French mechanic may coax an extra 10 h.p. out of an engine you can never be sure that he will not leave a spanner in the crank-case. And, when a French engineer has seen that his latest brain-wave works he is a little apt to lose interest in it and pass on to something else without staying to perfect his job.

German goods have always been robust and solid. But as a rule they lack finish, and are heavy for what they are needed to do. Moreover the heaviness is not always in places where it adds strength.

Taking the World's Workers all round the British Mechanic is the best of them all. And nowhere does his work show up better than in the intricacies of modern aeroplanes and their engines.

Nobody is going to pretend that every British workman is a master-craftsman. We have our share of bad men who disregard the maxim, which used to be posted up in most of our aircraft factories, to the effect that a fault in workmanship if concealed may cost a brave man's life. And for that reason we have our excellent Aeronautical Inspection Department to oversee the work of our best and worst men alike and to certify that every machine and every engine which carries the Air Ministry's Certificate of Airworthiness is made up to the standard of the high-class British workman.

That is why the British Airworthiness Certificate is a hall-mark recognised all over the World. An aeroplane with that hall-mark is always worth rather more than a foreign aeroplane of equal performance and with equal accommodation. The only thing that defeats us is a demand from a buyer overseas for accommodation which we do not provide. And, knowing something of the plans of our best manufacturers, one can say that soon we shall meet all needs.

OUR MATERIAL.

The position is the same where material is concerned. We have always been noted, from the beginning of the Industrial Era at any rate, for the excellence of our metal products. Sheffield steels, and our various bronzes and white-metals for bearings, have been the World's standards of quality for nigh a hundred years.

To-day, thanks to some extent to the pressure put on our research establishments during the War 1914-18, our high-tensile steels are still ahead of those of other nations. Our competitors may call them "trick steels," but they are reliable when used intelligently.

Our ordinary steel tubing, as well as newer kinds lately devised to be welded and still give high tensile strength, are as far ahead as are the said trick steels. And we are now producing rustless, or non-corrosive, steels which are coming up to the strengths of the older corrodible kinds.

Though iron and steel have been our best-known products in years past, we have more recently become one of the World's greatest producers of aluminium, thanks to our development of immense stores of water-power hitherto let run to waste. And with our production of aluminium we are progressing with the output of aluminium alloys.

Also, our research people, encouraged largely by the high intelligence of the Directorate of Research at the Air Ministry, are doing good work in developing the more obscure alloys towards the stage when they may become ordinary industrial products.

With all this progress we are getting nearer and nearer to the all-metal aeroplane. Even our light aeroplanes to-day are mainly built of metal, and wood is becoming more and more an accessory material. There will always be use for wood in aircraft, just as there is in ships, but the wooden aeroplane as such is already a back number.

Whatever may be the material which ultimately predominates, whether steel or aluminium, we can at any rate claim that our aircraft will be built of the best materials in the World.

So, as may be seen, we can build, and have built, aircraft and engines with the highest performance in the World. We have the finest workmanship. And we have the best material. All of which, when considered in the light of the progress of 1929, proves that British aircraft are, of their various types, the World's best. All that remains is for the British Aircraft Industry to produce in 1930 those types which the World's markets want. And then there will come that boom in Aviation which will make everybody's fortune,—not only here among our manufacturers, but in our Overseas Dominions where air transport is needed to develop the resources of the countries.

As Kipling said "Transportation is Civilisation." So let us provide for ourselves the air transport which will civilise our Empire.

A GENERAL REVIEW.

Let us now review the work of the British Aircraft Industry during the past year, so that we may see the progress which we are making. We will take the names of the firms in alphabetical order as they appear in the latest edition of "All the World's Aircraft," which has just appeared.

A.B.C. Motors Ltd.

This firm, although primarily concerned in the manufacture of aero-engines, has built a little cabin monoplane to demonstrate its latest type engine. This machine, which is called "The Robin," is about the only single-seat cabin monoplane in England. The public demand is for the two-seater cabin aircraft and for machines to carry greater numbers. But all the same there will be always a certain demand for single-seat sporting machines, just as there is for single-seat motor-bicycles. For these solitary-minded individuals, the Robin is an excellent proposition.

With a 40 h.p. A.B.C. Scorpion engine, it has a speed of about a hundred miles per hour. And those who have flown it say that it is a very comfortable little machine. At any rate it is practically in a class by itself and it conforms with the most modern ideas. Therefore, small as it is it is distinctly a step in the progress of aviation.

A.D.C. Aircraft Ltd.

This firm, formed as it was from the old Aircraft Disposal Company Ltd., does not set up to be primarily an aircraft-constructing firm. But the machines which it supplies, mostly to foreign countries, reconstructed and reconditioned from war-time aircraft, are so thoroughly overhauled that they may practically be considered as having been rebuilt and as being the equivalent of new machines of their own type.

During the past year this firm has continued its good work in supplying obsolescent types of British Aircraft at comparatively low prices to foreign countries, and thus has introduced British workmanship at prices which are competitive with those of foreign nations.

The firm's greatest contribution to the progress of aviation has been the introduction of the Hermes engine, which is a development of the Cirrus III. This will be dealt with more fully in the later section of this article, dealing with our aero engines. But here we must note the fact that the A.D.C. Company has designed a complete system of cowling for its Cirrus-Hermes engine, so that it can easily be built into the line of the fuselage of any machine which is designed for this particular engine.

This A.D.C. cowling is one of the most useful things which has been put on the aircraft market during the year. It is designed to give the least possible head resistance while at the same time giving the most efficient cooling to the engine inside it. The design of cowling is in effect a problem quite apart from the design of aircraft. Consequently, a man who is quite a first class aeroplane designer may easily produce a cowling for his engines which, though beautiful to look upon, affects the engine itself adversely and is not in itself of the best possible streamline shape. The A.D.C. people specialise in the design of their cowling and therefore have contributed definitely to British aircraft design.

Sir W. G. Armstrong Whitworth Aircraft Ltd.

This world-famous firm, which combines at once the fame of Armstrong-Whitworth engineering with the reputation which has been built up in the manufacture of aircraft and aero engines by Mr. J. D. Siddeley, has made a number of notable additions to the progress of British Aircraft engineering during the past year.

On the service side, the Siddeley Siskin single-seat fighter has been improved in detail and in general line till to-day it compares favourably in performance with foreign aeroplanes with considerably more power, and in this we must remember that the design of the Siskin is several years old and that the standard Air Force machine of to-day is a development of the early type and does not pretend to be in any way a new or revolutionary design. With the latest super-charged Jaguar engine, the latest Siskins have a remarkable climb and manœuvrability at great height.

During the past year a number of the Army Co-operation Squadrons of the Royal Air Force have been equipped with the Armstrong Whitworth Atlas, a two-seat biplane designed essentially for Army Co-operation. Carrying its

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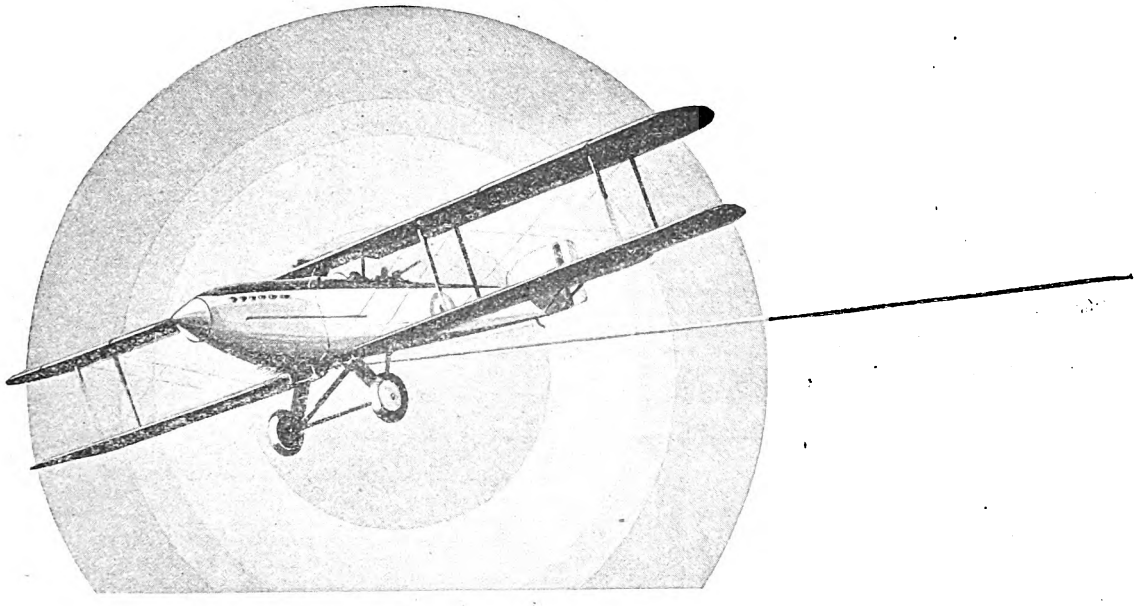

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full war-load of guns, ammunition, wireless apparatus and all the other paraphernalia pertaining to its duty, the speed of this machine with the standard Jaguar engine is 143 miles per hour at ground level, and 125 miles per hour at 15,000 feet. But with the new Jaguar Major Engine, geared and super-charged, the speed goes up to 175 miles per hour at 15,000 feet. This is a truly remarkable performance.

Both the Siskin and the Atlas are standard equipment in the Royal Canadian Air Force, and the Atlas is built under licence in the Greek National Aircraft Factory.

At the present day, when obviously the big money in aviation is going to be made out of civil aircraft, because there is practically no limit to the number of civil aircraft which the World can use, whereas there is a very distinct limit to the number of aircraft of war which countries can afford, perhaps the greatest interest of all centres in the Armstrong-Whitworth Argosy, which is used by Imperial Airways Ltd., on the London-Paris Air Line and more recently on the London—Basle Line.

The great problem of the moment before all users and designers of aircraft is how to build an aeroplane which will carry enough load, either of goods or passengers, or both, to pay its way at any possible fare which can be charged. The Argosy, with its three Jaguar engines, seems to have come nearer to solving this problem than any other aircraft in the world.

If one may judge by the balance-sheet of Imperial Airways Ltd., which is not noted for giving away too much inside information, there seem to be good enough grounds for assuming that the Argosies used on the London-Paris route do more than pay for their mere running expenses. The amount of money drawn from the Government in the form of subsidy may very well have been spent in paying dividends and on overhead charges and development expenses, and the other costs which are inseparable from developing what must ultimately be our Air Line to Australia. That being so, there seems to be reason enough for assuming that the money taken for passengers and freight has actually paid for the running expenses of the aircraft themselves and for their repairs and upkeep, and for the pay of pilots and mechanics and aerodrome staff.

Certain of the aircraft used by Imperial Airways Ltd. are of antiquated type which obviously cannot come anywhere near paying their way. Consequently the logical conclusion seems to be that the fleet of Argosies must not only be paying their own way, but must be paying for the losses on the obsolete types of aircraft as well. So the Argosy seems to be the most efficient passenger-carrying aeroplane in the world, judged purely from the financial point of view. And after all the financial point of view is that which in the end must make or mar the success of commercial aviation in this and all other countries.

A. V. Roe & Co. Ltd.

Here is another firm which has contributed materially to the progress of British Aviation during the past year. All who have been interested in aviation for more than a few months know that A. V. Roe & Co. Ltd. is one of the two or three oldest aircraft firms in this country, or indeed in the World. But the fact must be restated because there are so many newcomers into aviation every day.

The name of A. V. Roe & Co. first became World-famous because of their two-seat training biplane known as the 504K type. This was introduced in about 1913 and it was used on active service in the early days of the War 1914-18. With machines of this early type the Zeppelin works at Friedrichshafen were bombed and the Zeppelin shed at Düsseldorf was destroyed. Thereafter, when more powerful and faster aeroplanes came into use for fighting purposes, the Avro still remained the standard training machine both for Naval and Army pilots. After the end of the War 1914-18, the Avro remained the standard training machine in the Royal Air Force and was taken up by the majority of countries in the World as the standard training machine for their Service pilots.—that is to say by all countries which did not, or do not, manufacture their own aircraft.

Also in this country, and in all the British Dominions, the standard training aeroplane became practically the standard joy-riding machine. How many millions of people have been taken up as paying passengers in Avros since the War, must be almost incalculable. One firm in England alone, The Berkshire Aviation Tours Ltd., has taken up something like half a million passengers. And every other joy-ride firm in the British Empire has been using Avros.

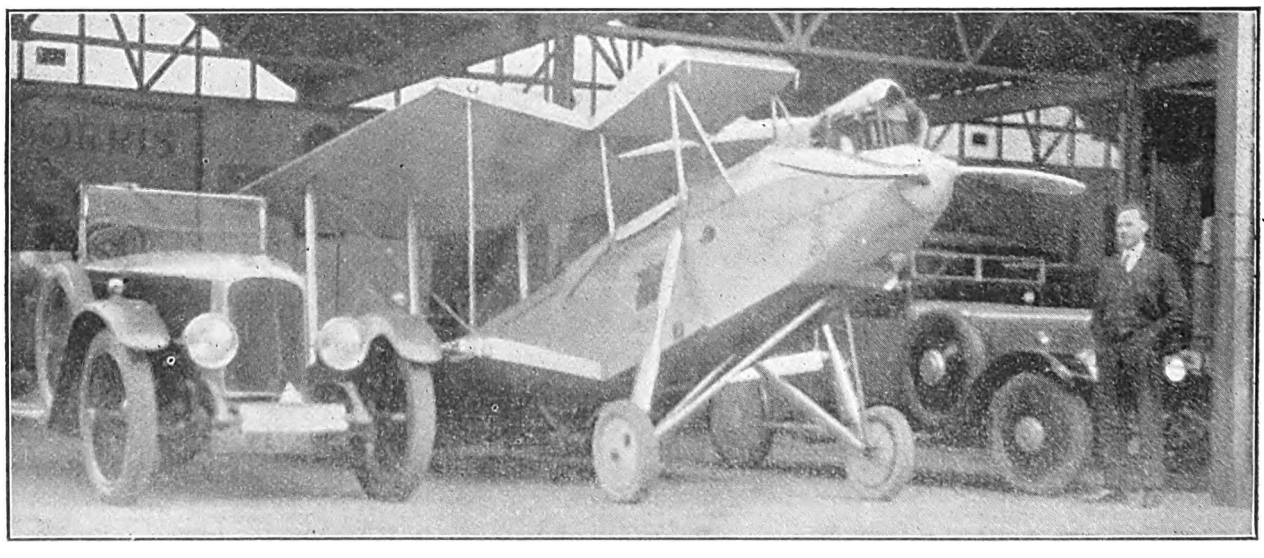
Perhaps the most remarkable thing about it is the amazingly small number of fatal accidents which have happened to pilots and passengers on Avros. It is generally claimed to be the safest and the most controllable aeroplane in the World. And the claim can probably be substantiated.

About a year ago Mr. J. D. Siddeley, who had already formed Armstrong-Whitworth Aircraft Ltd. and Armstrong-Siddeley Motors Ltd. into the greatest aeronautical engineering concern in the British Empire, or in Europe, acquired the control of A. V. Roe & Co. Ltd. from Crossley Motors Ltd., who previously had held the majority of the shares. Mr. Siddeley re-organised the whole Avro firm and retained most of the men who were responsible for the remarkable success and the continual improvement of Avro aircraft in the past.

The result has been that the old 504K Avro has yet again been improved, and with the Armstrong-Siddeley Lynx engine has been made again the foremost training machine in the World. It has been bought by all the British Dominions and by practically all foreign countries.

Still more recently the Avro firm has turned out a new type of military training biplane with the 150 h.p. Armstrong-Siddeley Mongoose engine, which has a performance higher than that of the standard 504K with the 200 h.p. Lynx engine. This machine is in fact a kind of half-way stage between the elementary training machine and the high-speed fighter. It is altogether a remarkable aeroplane and is indeed a contribution to our progress.

On the purely civil side, which, as has already been said, is the money-making side ultimately, the Avro firm have also gone ahead. The Avro Avian was one of the earliest of our successful light aeroplanes—a type of aircraft in which the British constructor has excelled. The new Avian with either the Cirrus III. engine, which has been already mentioned, or with the 105 h.p. Armstrong-Siddeley Genet Major engine, is undoubtedly one of the



GARAGED.—An Avro Avian belonging to Mr. N. Brett of Norwich in the garage of Mr. G. F. Surtees in Bevan Street, Lowestoft, during the gales which prevented the owner's return. Mr. Surtees, who is seen on the right of the picture, is also the owner of an Avro Avian, for which type of machine he is the local agent.

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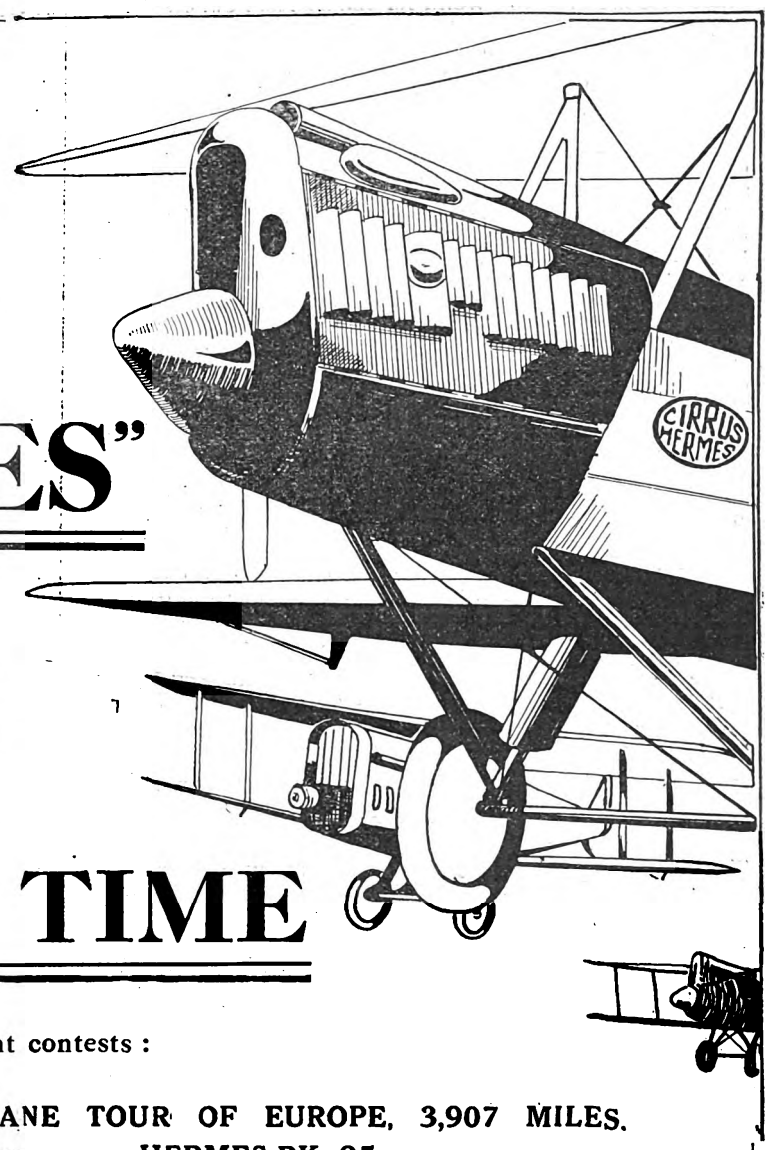

105/115 H.P.

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finest aeroplanes in the World for the sporting owner. The speed is high, the cost of upkeep is low. It is easy to handle and it is cheap to house.

Great as has been the help to progress which has been given by the development of the Avian and the old 504K, there seems every possibility that a very profitable side of the firm's business before very long will be concerned with two new types, known officially as the Avro 10 and the Avro 5, from the number of passengers they accommodate.

The genesis of these machines displays on the part of Mr. J. D. Siddeley, the moving spirit of the firm, a freedom from prejudice and a judgment of public demand which augurs well for their financial success.

All our industries show that our most remarkable steps in progress have been achieved by adopting foreign products and adapting them to our own purposes. Mr. Siddeley seeing that there is a demand all over the World for a cabin monoplane with plenty of power and a multiplicity of engines, and seeing that the product of Mr. Antony Fokker of Amsterdam seemed to be the most popular of this class, boldly acquired the Fokker rights for the British Empire.

The fact that in the past two or three years a number of the greatest flights in the world have been made on Fokker monoplanes of one type or another demonstrates the justice of Mr. Siddeley's choice, and before long we shall undoubtedly see performances put up in this country by the Avro 10 which surpass those of the ancestral Fokker. The first samples of the Avro 10 and the Avro 5 which were shown at the Aero Show at Olympia in July 1929 met with general admiration.

The Avro 10 with three 250 h.p. Armstrong-Siddeley Lynx engines has a speed of 115 miles per hour. With the Lynx Major and geared airscrews, this performance will obviously be a good deal higher. And then it will compete with machines of similar capacity in other countries which use considerably more power and cost considerably more to build and buy.

The Avro 5 is a miniature of the Avro 10. It is intended to seat four passengers and a pilot. The three Armstrong-Siddeley Genet Major engines of 105 h.p. give it a top speed of 121 miles per hour and a cruising speed of between 100 and 108 miles per hour.

The first of these machines to be built has already made a quite satisfactory voyage to our East African Colonies where it is being used for regular air line work. At present the price is high but it is not too high for a rich man to afford for his own private air yacht.

There is in fact considerable interest and satisfaction in noting that one of the very oldest firms in the British Aircraft Industry should to-day be leading in this particular type of passenger carrying aircraft.

The Blackburn Aeroplane and Motor Co. Ltd.

Here is another of our pioneer aircraft firms which has made good and continues to progress. Mr. Robert Blackburn was experimenting with aeroplanes of sorts somewhere about 1907, and to-day is still in the forefront of aircraft constructors.

The Blackburn Bluebird was the first successful side-by-side light aeroplane. By its nature it was slower than other light aeroplanes in which the passenger and pilot sit in tandem. But it had a good performance. During 1929 the original type of Bluebird was transformed from wood to metal construction.

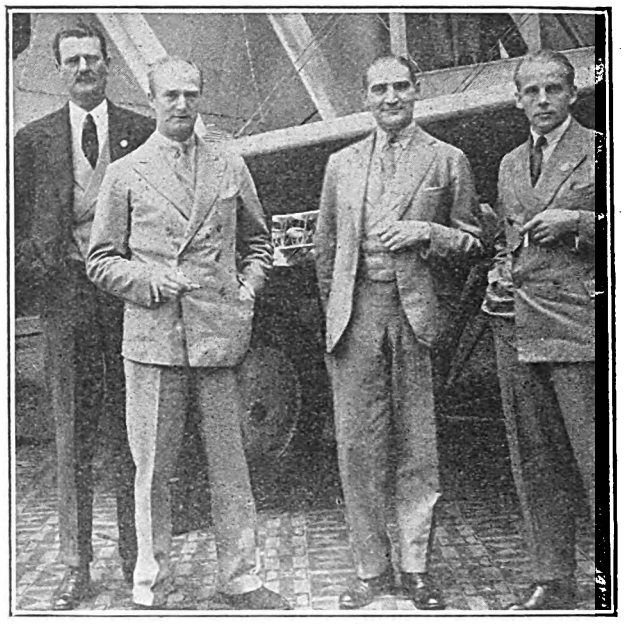
The change-over meant hanging up output and there was at the same time no good in pushing the sale of the machine if it could not be delivered. Consequently the Bluebird lost some of the popularity which it might have gained if the output and the accompanying propaganda had been continued. We may, however, expect to see a revival of the all-metal Bluebird in the current year. In the meantime one can safely say that it is quite one of the most easy aeroplanes to fly that has ever been produced.

In quite a different line the Blackburn Company has made a name during the past year for a single-seat fighter called the Lincock. This machine was originally produced to prove that high-performance fighters can be built without using the vast amount of power which has become customary in the Royal Air Force and in the Flying Services of all Nations.

The Lincock with the geared Armstrong-Siddeley Lynx has a speed of 154 miles per hour at ground level, but with the Lynx Major it has a speed of 164 miles per hour, with guns and ordinary fighting equipment, though not all the gadgets with which the Royal Air Force thinks fit to load fighting machines.

This machine is in fact a direct challenge to those light fighting machines known in France as the "Type Jockey." And be it said, it has a higher performance than any of the French Jockey machines.

It has not been adopted by the Royal Air Force, but it



THE BLACKBURN AEROPLANE AND MOTOR CO. LTD.—Brig.-Gen. Francis Festing, Mr. Robert Blackburn, Mr. Charles Blackburn, and Mr. R. Rhodes.
("Aeroplane" photograph.)

has been so well demonstrated at various flying meetings during the past twelve months and it has been so highly appreciated by a number of R.A.F. pilots who have flown it, that it is pretty sure of coming into general service in the air forces of other Nations if not in this country. For our particular purposes it may not carry as much equipment as we like, but it would have the advantage of being an excellent advanced training machine for our fighter squadrons. And in any case it is a remarkable advance in design and construction.

As in previous years the Blackburn Company have supplied a number of machines to the R.A.F. for the Fleet Air Arm, of the type which is now generally known as the torpedo-bomber. A new type, the Beagle, with a Bristol Jupiter engine, has been particularly successful. And the firm has sold to Finland a license to build Blackburn Ripons with Jupiter engines.

The greatest achievement of the Blackburn Company of late years has undoubtedly been the Blackburn Iris. This three-engined flying boat, one of which took Sir Philip Sassoon to India and back when he was Under-Secretary of State for Air, proved itself to be one of the best sea-going flying machines the World has yet seen. The machine used on that occasion had three Rolls-Royce Condor engines of 650 h.p., as readers of Sir Philip Sassoon's remarkable book "The Third Route" will remember. And the probability is that in future Iris Flying Boats the Rolls Royce H type engines will be used. The hull of the Iris is of duralumin and the whole structure is of metal. The wings have steel spars, but are covered with fabric.

One of the great attractions of the Aero Show at Olympia was the all-metal hull of the Blackburn Nile flying-boat. This in itself showed to the public, as well as to the engineers of all nations, the remarkable progress which we are making in the use of metal in hulls. The appearance of the Nile for her first flying trials is awaited with intense interest. The machine itself is a large thick-winged monoplane with three Bristol Jupiter geared engines.

Boulton & Paul Ltd.

The old-established firm of Boulton & Paul actually came into the aircraft business during the War 1914-18. Since the war they have had their Aircraft Department (under Mr. J. D. North) chiefly devoted to experiments in steel construction. The particular system of steel work for aircraft produced by Mr. J. D. North has been used with great success in the structure of the new Airship R 101. And so far the experimental flights with that ship have thoroughly justified the trust which the designers have put in Mr. North's system.

Apart from the big airship, Boulton & Paul have been very successful with a twin-engined biplane known as the Sidestrand. This, with two Bristol Jupiter engines, each of 450 h.p., has been adopted as a medium-range bomber by the Royal Air Force. The pilots of the squadrons which are already equipped with this type seem to be very well pleased with it.

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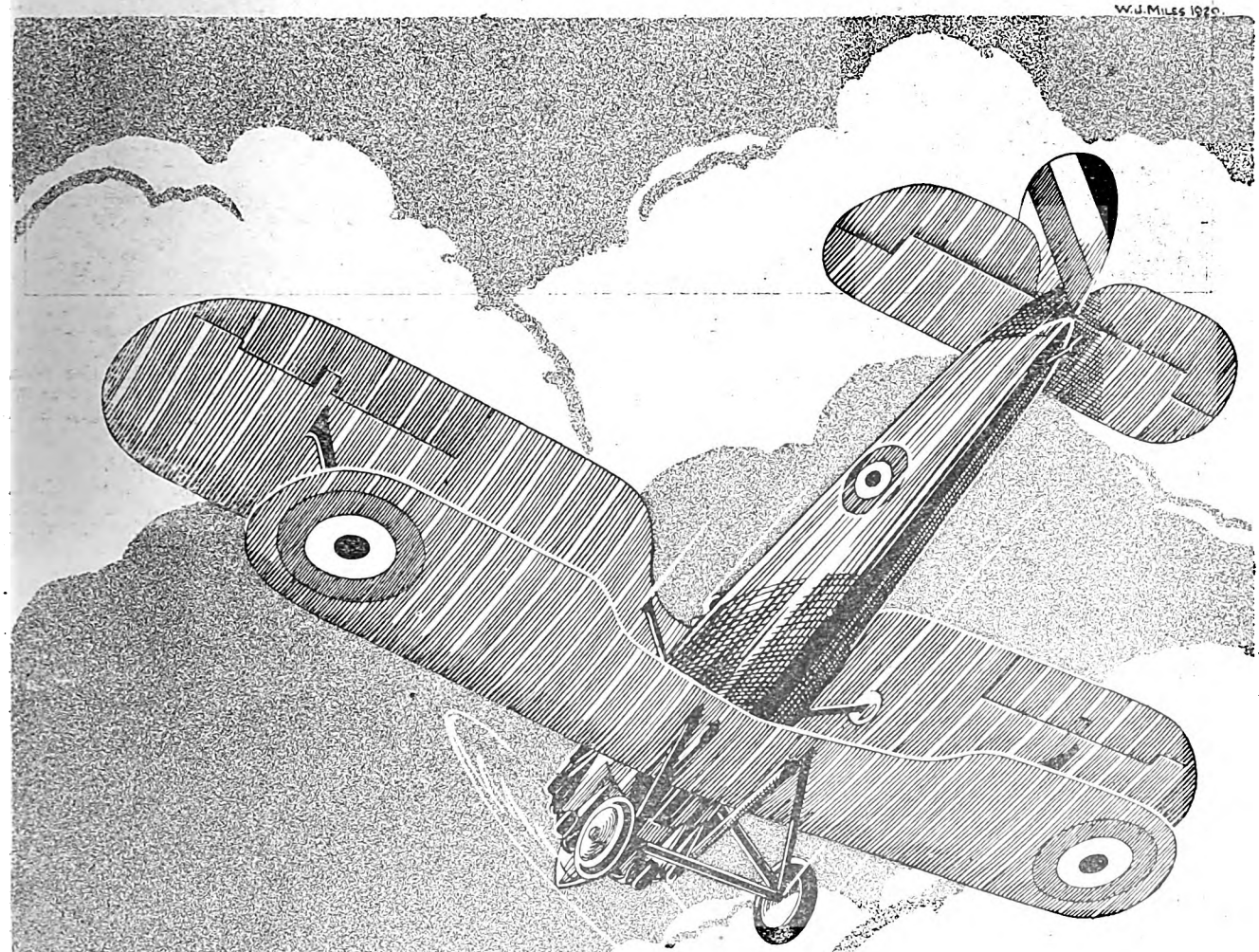

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STEEL AIRCRAFT CONSTRUCTION

The "Bristol" method of steel aircraft construction, such as is embodied in the design of the "Bristol" Bulldog Single-Seater Fighter, has been evolved with such considerations as easy repair and maintenance always in prominence. As a result structures of "Bristol" design are capable of being repaired by semi-skilled labour are easily maintained, and are exceptionally light and rigid.

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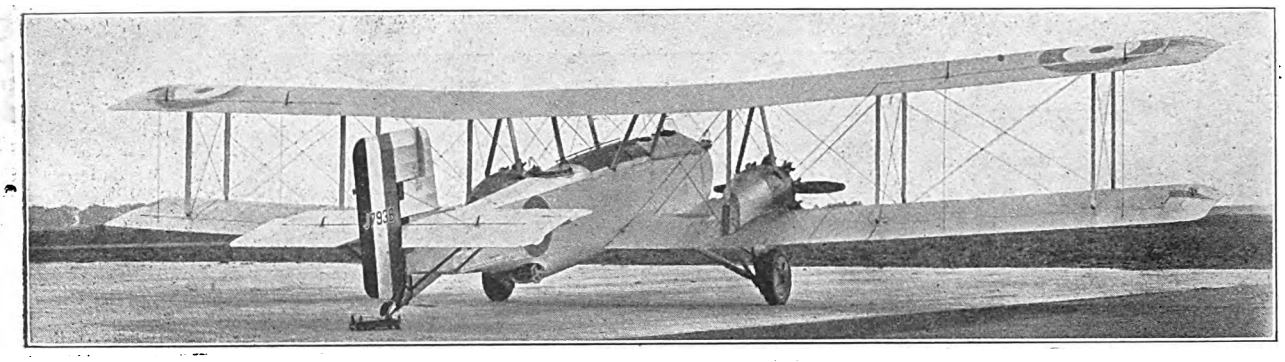


AN ALL-METAL PRODUCT.—A Boulton and Paul Sidestrand (Jupiter engines).

With the new geared Jupiter this machine, carrying full war-load, has a speed of 145 miles per hour at 10,000 feet. Also its service ceiling is at 24,000 feet, which is quite good enough for most air wars.

The Bristol Aeroplane Co. Ltd.

This firm may be properly regarded as the pioneer firm of the British Aircraft Industry. It was founded by the late Sir George White of Bristol as the first Limited Company with adequate capital and workshops for the production of aircraft in the British Empire. It was then known as the British and Colonial Aeroplane Company Ltd., but all its products became so well known as Bristol products that some few years ago the name was changed to its present form.

During the War 1914-18 the Bristol Fighter designed by Capt. Frank Barnwell was one of the most deadly weapons in the hands of the Royal Flying Corps, and later of the Royal Air Force. It, more than any other one type, contributed to our holding at the end of 1917 practically the complete control of the air on the Western Front.

Practically in its original form the Bristol Fighter survives even to-day in the Royal Air Force. In fact it has only been replaced during 1929. By way of revenge for its replacement in the two-seat-fighter Army Co-operation class, Capt. Barnwell has produced the Bristol Bulldog, a single-seat fighter biplane with the Bristol Jupiter engine, which is now coming into use as the standard single-seat fighter in the Royal Air Force.

The Bristol Bulldog is, like all Capt. Barnwell's designs, pleasing to the eye. But even more than that its construction is pleasing to the practical engineer. For a good many years Capt. Barnwell has concentrated on experiments in steel construction, and the Bulldog marks the last, or rather the latest, stage of his experiments.

At the Paris Aero Show in 1928, the system of construction now embodied in the Bristol Bulldog was one of the most admired things in the show. And now that it has been made a production job, and squadrons of the Royal Air Force are equipped with Bulldogs, the system of construction has thoroughly justified itself.

Besides the Bulldog, the Bristol people have produced a modified version of the old Bristol Fighter and have continued the production of their school machine and one or two other types. But as this particular article is concerned only with the new work of each firm, we must be content with regarding that as a continuation of the good work of the past which thoroughly maintains the high standard which has always been indicated by the word "Bristol."

The Bulldog is now standard in the Royal Australian Air Force and in the Latvian Air Force. The Bristol Boarhound is standard in the Mexican Air Force.

The Jupiter engine will naturally be dealt with in the section of this article which is concerned with engines.

The Cierva Auto-Giro Ltd.

The Cierva Auto-Giro, commonly known as the "windmill plane," remained in 1929 much as it had been in 1928. Those who saw it at the Aero Show at Olympia in July 1929 will remember that to help it getting off, the tail was made into a biplane, the lower plane of which could be cocked up at an angle so that the air from the slip-stream of the air-screw could be deflected upwards onto the revolving vanes or windmill, so that this apparatus could be started while the machine itself was still at rest on the ground. This device does away with the need for rushing round and round for a few miles before the windmill gets up enough speed to lift it off the ground.

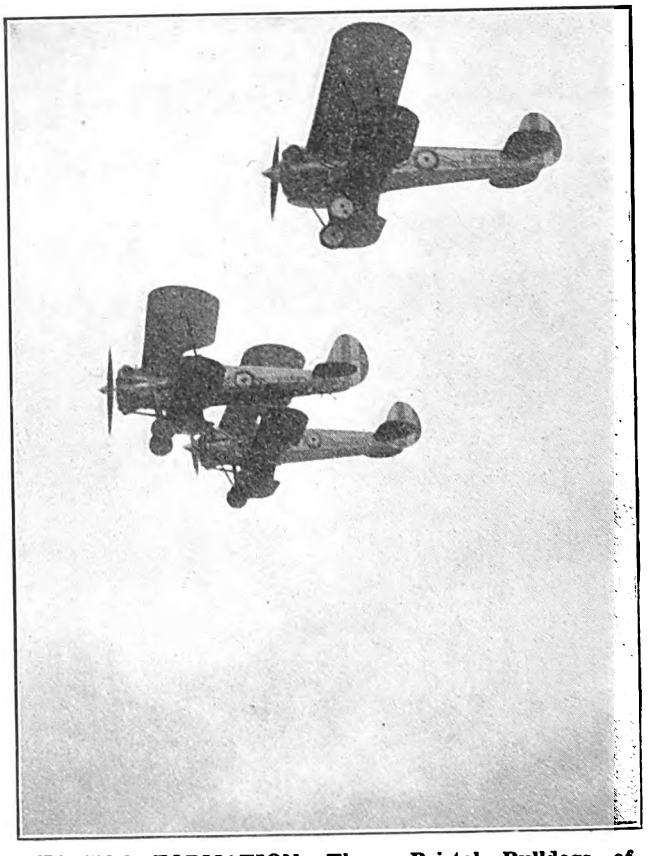
Nevertheless, the Auto-Giro seems to be still a good way behind any ordinary aeroplane in the little matter of getting off the ground with a short run. And until this difficulty is overcome there is not so much satisfaction to be got as there might be out of the fact that the Auto-Giro can be landed almost vertically. Furthermore nobody has yet built an Auto-Giro with anything like the horizontal speed of an ordinary aeroplane of the same power. Consequently, we may without being rude, say that the Auto-Giro has still a good long way to go before it can compete for practical purposes with ordinary aeroplanes as we know them.—But it is progressing.

The Civilian Air Craft Company Ltd.

The Civilian Company is a new concern which made its first appearance in 1929. The leading spirit of the firm, who is also chief designer and chief engineer, is Mr Boultbee. He has had many years' experience as a designer with several of our leading aircraft constructors and has assimilated about as much knowledge as any individual could do in the time.

As the name implies, this firm was formed entirely with the idea of building civil aircraft and not military aircraft. The first machine appeared at Heston Air Park on the day of the King's Cup Race, and it made quite a favourable impression. It is a side-by-side cabin monoplane with a four-cylinder A.B.C. Hornet engine, which is a horizontal engine with two cylinders on each side opposed to one another.

Since its first appearance in July, a good deal of development has been done on the first experimental machine, small faults have been discovered and alterations have been made to suit the ideas of practical pilots. It is very definitely a step in the direction of meeting the demands of pilot-owners, and as such it is a valuable contribution to the progress of British Aviation. Its behaviour in public during the forthcoming year will be watched with great interest.



FLIGHT FORMATION.—Three Bristol Bulldogs of No. 17 (Fighter) Squadron at Upavon in dirty weather. The Squadron is commanded by Sq. Ldr. A. R. Arnold, D.S.C., D.F.C.—("*Aeroplane*" *photograph.*)

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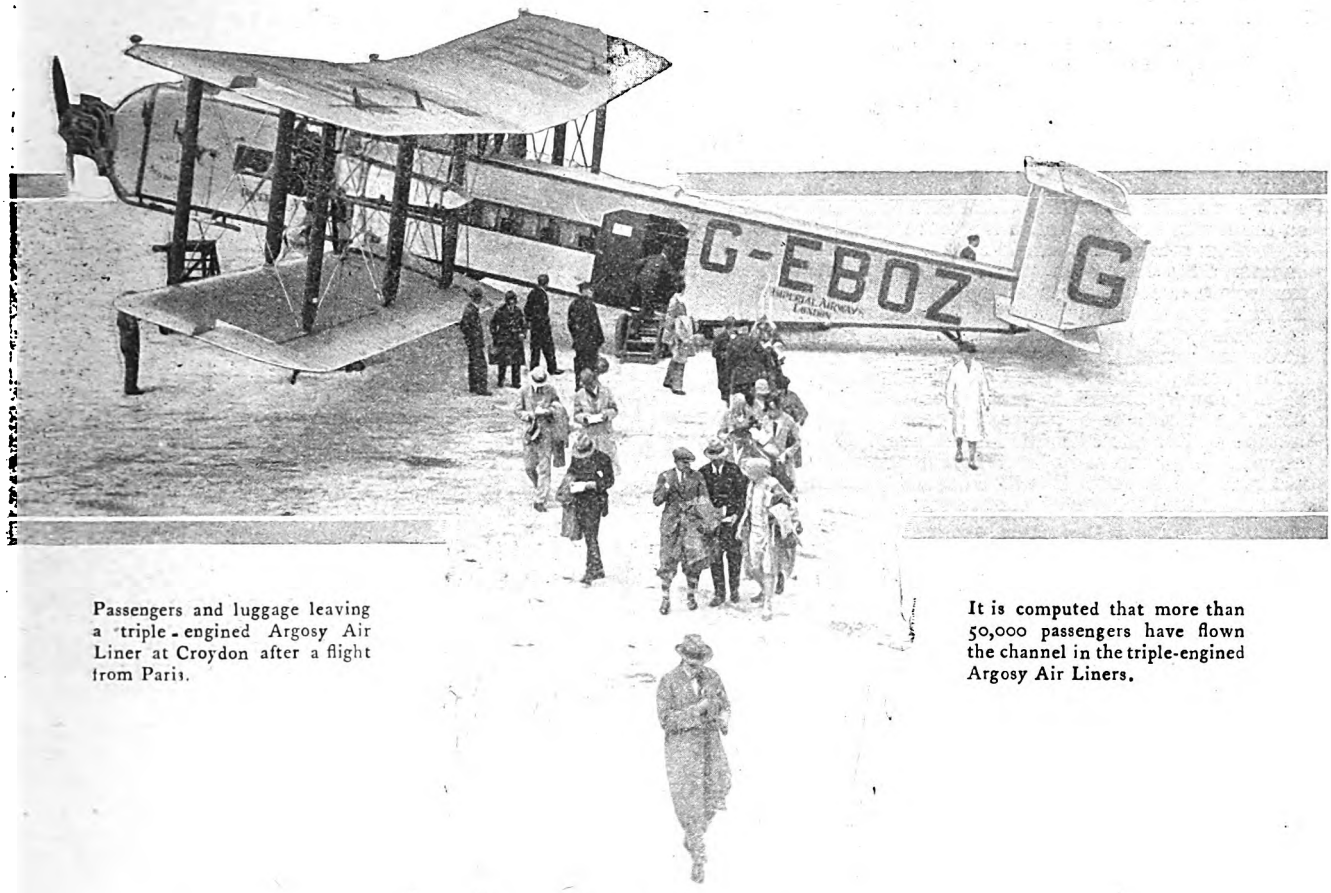

Passengers and luggage leaving a triple-engined Argosy Air Liner at Croydon after a flight from Paris.

It is computed that more than 50,000 passengers have flown the channel in the triple-engined Argosy Air Liners.

During the past four years the public record of the Armstrong Siddeley Engined

ARGOSY

AIR LINERS

has proved them to be the safest, best paying and most easily maintained Air Liners in existence.

The figures given below are totals relating to the operation of all seven Argosies in the European fleet of Messrs. Imperial Airways, Ltd.:

Total miles to 31st October, 1929 - - -	919,320.
Approximate number of Channel Crossings to 31st October. 1929 - - - - -	3,750.
Number of hours flown - - - - - -	10,118.

SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT LIMITED.

Works and Aerodrome: Whitley, nr. Coventry. London: 10, Old Bond Street, W.1.

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The Comper Aircraft Co. Ltd.

This firm was only incorporated in April 1929, when Flight Lieutenant Nicholas Comper, having resigned from the R.A.F., joined with Mr. G. H. Dawson, who is the owner of the Hootton Park Aerodrome, near Birkenhead, and with Flight Lieutenant J. Bernard Allen, the instructor of the Liverpool Aero Club, and formed a Company to construct aeroplanes to his own designs.

Flt. Lt. Comper had already made a name as the designer of four small machines known as the C.L.A. Series when he was instructor at the R.A.F. Cadet College at Cranwell. At the moment of writing this firm's first aeroplane, known as the Swift, has just made its trial flights. The Swift is a high-wing monoplane, single-seater, with a 40 h.p. A.B.C. engine. This has been put on the market to meet the immediate demand for a cheap, light single-seater. But of its kind it is a very interesting little machine and is a considerable step towards the production of aeroplanes at moderate prices.

The next product of the Comper Company will, however, be of greater interest to most people concerned with aviation, for it will be a two-seater cabin monoplane. This is a type which our Dominions will need. Flt. Lt. Comper's experience as an aeronautical engineer assures that when his machine appears it will compete with anything of its kind produced in foreign countries.

The Desoutter Aircraft Co. Ltd.

The Desoutter Sports Coupé is quite one of the most interesting aircraft produced in Great Britain during the past year. Mr. Marcel Desoutter, who was a pre-war Blériot pilot, lost his leg in a bad accident in 1913. Having made an artificial leg for himself, he proceeded to make thousands of artificial legs for other people during the War, and, having established that business on a firm basis, he began to take a renewed interest in aviation some four or five years ago.

In 1928 he made up his mind to come into the aircraft business. He acquired from Mr. Frederick Koolhoven, the famous Netherlands designer, the rights of construction for the British Empire of a three-seat Cabin Monoplane known as the F.K.41. He engaged as his Works Manager Mr. G. H. Handasyde, one of the earliest of British pioneers, who in 1908 or 1909 was already building experimental aeroplanes and later became partner with Mr. Martin and formed the famous Martinsyde concern, whose aeroplanes were, during the War, regarded as among the very best British products.

To meet the demands of our Air Ministry, the original designs of the F.K.41 were somewhat modified in detail. Mr. Desoutter and Mr. Handasyde decided to use different wing sections, and their machines, which are now being built in regular series, are among the best light aeroplanes in England,—which is to say in the whole World. In fact the Desoutter Monoplane can be given the credit of being the first Cabin Monoplane to be built in this country in accord with the general demand for aeroplanes of this type.

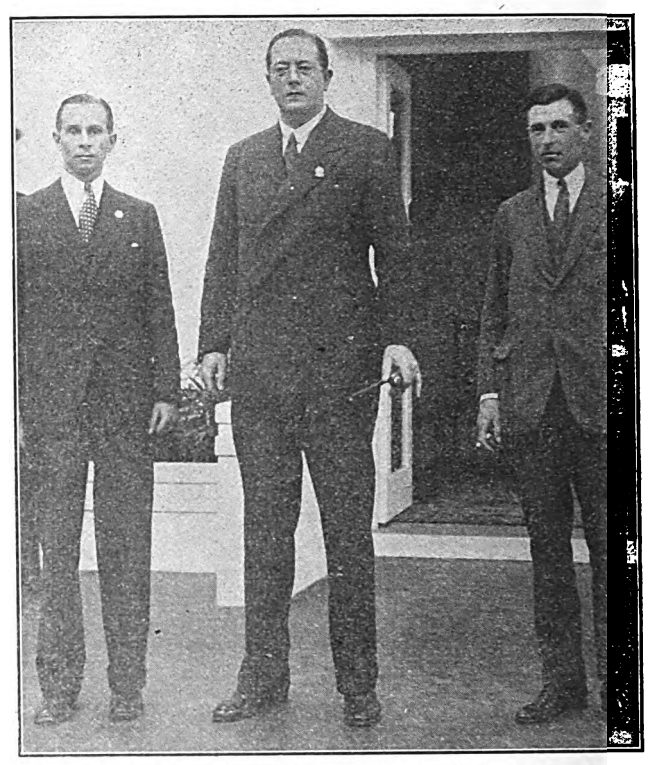
The first Desoutter Monoplane was built with an A.D.C. Cirrus engine, but the later products have the Hermes engine. With this the little machine with a pilot and two passengers on board has a proved speed of something well over 110 miles per hour

The Fairey Aviation Co. Ltd.

The history of Mr. C. R. Fairey as an aircraft constructor has so often been told in this paper that there seems no need to go into details beyond saying that he started life as an electrical engineer, went to Eastchurch, then the first Naval Aerodrome, to work on the Dunne biplane, which was our first attempt in this country to build an aeroplane which was inherently stable, and from there joined the pioneer firm of Short Brothers as Works Manager.

He left Short Brothers to form the Fairey Aviation Company, and this firm has become not only one of the greatest British aircraft constructing firms, but one of those firms which is regarded all over the World as a leader in design,—which amounts in fact to being a leader of fashion.

Mr. Fairey, having built vast quantities of highly successful seaplanes during the War, and immediately after, modified his seaplane, of the type known as the III.D. into a land-plane, and it achieved equal success as such.



THE FAIREY AVIATION CO. LTD.—Sq. Ldr. M. E. A. Wright, Mr. C. R. Fairey and Mr. F. G. T. Dawson.
(*"Aeroplane" photograph.*)

In 1924 he acquired from the Curtiss Company of America their design rights, and the rights of the Curtiss D.12 engine. With the D.12 and the Curtiss design wedded to his own wide knowledge of aircraft construction, he produced in 1924-25 the Fairey Fox, a two-seat general-purpose machine, or high-speed bomber, which still remains unsurpassed among aircraft built of wood.

Later the old familiar III.D. was modified into a Fox-like shape and with a Napier engine became the standard general purpose machine of the Royal Air Force. Such has been the success of the III.F. in the R.A.F. that it has been adopted as a general purpose war machine by a number of other countries, including the Irish Free State, Chile, Argentina, Portugal and, one believes, Greece.

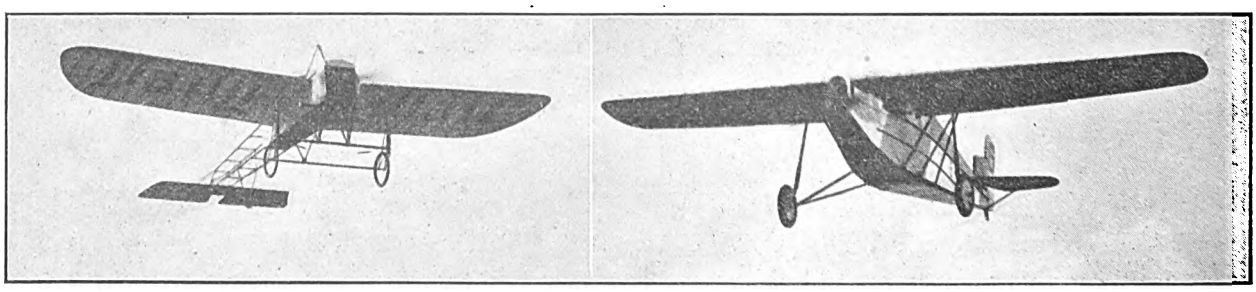
Argentina has adopted the French Lorraine-Dietrich as their standard engine, and the III.F., as supplied to that country with these engines, has a very fine performance.

It has also been tried out with the geared Armstrong-Siddeley Jaguar engine fitted with what is known as the Townend ring over the engine. With this it has also a remarkable performance, but figures are at present confidential.

The III.F. has also been adopted by the Fleet Air Arm as a deck-flying machine. And it has been fitted with floats for our Fleet Air Arm and for the Chilean and Argentine Navies.

Taking it all round, it has been during the past year and the year before quite one of the most successful aeroplanes in the World, and the number of III.Fs which have been exported to foreign countries has contributed very largely to the rise in British exports during the past two years.

With this excellent record there is the greater satisfaction in recording the contribution to the World's aeronautical progress which has been made by the Fairey Company



FIRST AND FOREMOST.—On the left Mr. Marcel Desoutter flying his old Blériot monoplane before the War 1914-18, and on the right the latest Desoutter Sports Coupé (Hermes engine), the first light aeroplane of the cabin type. The resemblance between the general aspects of the machines is quite remarkable.

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WORLD'S RECORD WITH A GENET ENGINE

2670 km. (1,660 miles) in a straight line by Pilot Zimberly on a Barling N.B.3 fitted with an 80-88 h.p. Armstrong Siddeley Genet, at Brownsville, United States. (Light Aircraft Class 3.)

ARMSTRONG SIDDELEY

MOTORS LIMITED,

COVENTRY, ENGLAND, and 10, Old Bond Street, London, W.1.

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during 1929. The Fairey Long-Range Monoplane designed and constructed in 1928 made early in 1929 the first non-stop flight, from England to India, piloted by the late Sq. Ldr. Jones-Williams and the late Flt. Lt. E. C. Jenkins, who were, unhappily, killed recently in an attempt to fly the same machine non-stop to South Africa. This machine's flight to India far surpassed any flight made by any other monoplane in the World, and it was only the mischance of meeting a contrary wind in the Persian Gulf that prevented it from beating the existing World's Record for distance.

Since the long-range monoplane was built the Fairey Company have produced two other very remarkable aeroplanes. One of them, the Fairey Firefly, with a Rolls-Royce F. type supercharged engine, is claimed to be the world's fastest single-seat fighter. Unfortunately for the purposes of this article the actual performance figures are kept secret, as the machine is the property of the Air Ministry, and very properly we do not care to advertise to all foreign nations exactly the performance of our best war machine. But if publication of the figures were permitted we should be able to show that we have nothing to fear by comparison with the product of any other nation.

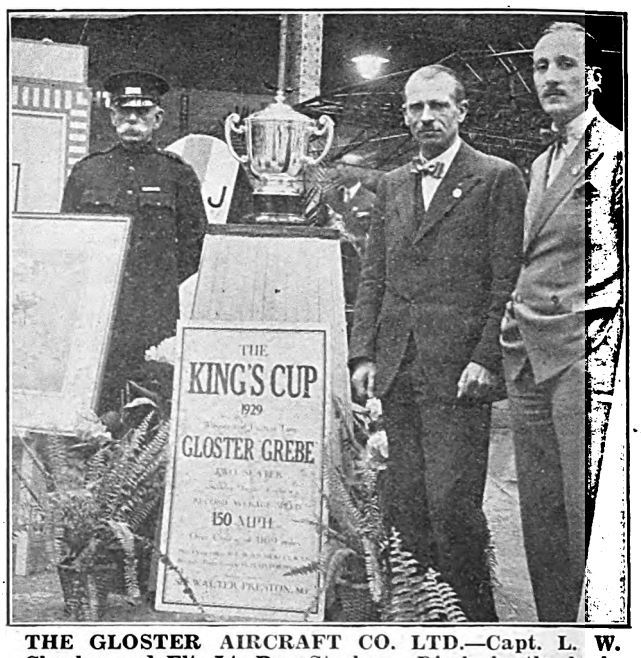
The other machine is in fact a modification of this same machine, built as a two-seater fighter and fleet reconnaissance machine, or ship-plane, as it is called officially. This machine is equipped with certain minor modifications to suit shipboard work, such as internal arrangements to stand being shot off from a catapult. In its class it is also claimed to be the fastest in the world.

The Fairey Company have also developed on their own account a system of metal construction which, like other systems of metal construction developed by British firms, is undoubtedly ahead of those produced in any other country. This country is essentially a country of metal-workers, and our success in the production of metal aircraft is only natural, but there is no reason why we should not take to ourselves full credit for our success in this particular type of work.

Glenny and Henderson.

The Glenny and Henderson Gadfly is a little low-wing single-seat monoplane, designed by Capt. K. M. Pearson for the firm aforementioned. This firm was formed in 1929 to manufacture this particular light aeroplane. Col. Henderson's idea is that there is a good deal of use and quite a reasonable market for cheap light single-seaters on which new pilots who are qualifying for their class B pilot's certificate, entitling them to carry passengers for hire or reward, can put in the number of hours' flying demanded by the Air Ministry for such a certificate, and can do it at the lowest possible cost.

Apart from that the Gadfly is, with either the 40 h.p. Salmson engine or with the A.B.C. Scorpion engine, a very pleasing little mount for the man who wants to fly by himself. The machine is usually fitted with the ordinary type of aileron but it is also fitted with an ingenious type of rotary aileron designed by Capt. Pearson.



THE GLOSTER AIRCRAFT CO. LTD.—Capt. L. W. Charley and Flt. Lt. Rex Stocken.—Dimly in the background may be seen the modest Mr. David Longden.
("Aeroplane" photograph.)

The Gloster Aircraft Co. Ltd.

The Gloster Company are already well known all over the world for their single-seat fighters such as the Grebe, the Gamecock, and the Goldfinch. In 1929 this series was extended by the production of the Gloster Gnatsnapper, a single-seat fighter ship-plane, with the new Bristol Mercury engine. The performance figures for this machine are not published, but from the fact that the earlier Goldfinch does 172 miles per hour at 10,000 feet with the Bristol Jupiter super-charged engine, we may assume that the later type with the more powerful Mercury will have a higher performance.

But the Gloster Company's greatest claim to a place in the forefront of the progress of 1929 rests on their production of the Gloster Survey Biplane, which was built to the requirements of the Aircraft Operating Co. Ltd., primarily for Air Survey purposes. This machine is a twin-engined biplane with two Bristol Jupiter geared engines of 475 h.p. each. The requirements of the Aircraft Operating Co. demanded the ability to fly on one engine should the other one fail, and the carrying of enough petrol for long voyages of survey over wild country, carrying full photographic equipment. The result has been quite remarkable.

BRITISH PERFORMANCE.—The Fairey single-seat Fi ghter Ship-plane (Rolls-Royce F. engine), which is one of the fastest and certainly one of the most beautiful fighter biplanes in the World.

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With its two Jupiter engines it has a top speed, low down, of over 150 miles an hour, and at 20,000 feet, which is about the highest reasonable height for photography, it can cruise comfortably at 100 m.p.h. for 7½ hours at a stretch.

In every way the machine on test has exceeded the performance demanded from the designers.

In it we see the possibilities of a passenger-carrying aeroplane which far surpasses anything which has been produced in any foreign country up to the present. The machine is built on the all-metal system which has been developed by the Gloster Company and the Steel Wing Company, which was not long ago embodied in the Gloster Company. Here then we have truly convincing evidence of how well British detail designers and constructors can do when occasion demands.

When the demand for passenger-carrying aircraft of this type justifies production of it in quantities and so allows the manufacturers to cut the price of each individual machine down to something like that of foreign machines of similar capacity, but of lower performance, there will undoubtedly be a big market for these aircraft.

Over and above these successes, the Gloster Company deserves great credit for the Gloster VI racing seaplane built for the Schneider Trophy Contest of 1929.

How good this type of machine was may be gathered from the fact that the experienced pilots who composed the High Speed Flight, who were appointed to form the team for the Contest, were practically equally divided in their affection for the Gloster machine and for the Supermarine S.6 which ultimately won the Contest. The two pilots who were allocated to the two Gloster machines chose to fly that type because they liked it the better of the two.

Just how high a speed the Gloster could have reached is not yet known because at the time of the contest, and during the two or three weeks available to practise before it, the Gloster machines were suffering from some undiscoverable trouble which caused misfiring in their engines.

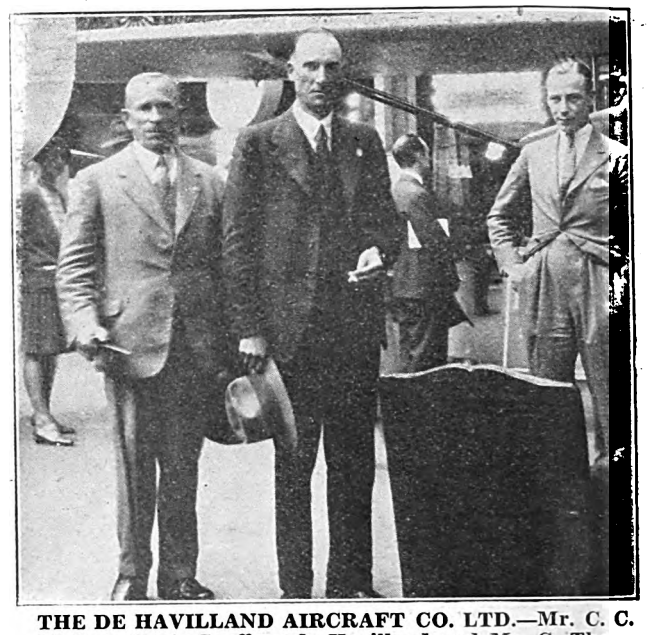
The trouble was merely intermittent misfiring, but that was enough to pull the speed down considerably. In spite of this, on the day after the contest one of the Gloster machines was sent over the course and did actually beat the previous World's Speed Record and the speed set up in the Schneider Contest itself. There are hopes that during the coming year the cause of the trouble will be located and that the Gloster may have another chance of regaining the record, even though it be from its British competitor.

Altogether the Gloster Company have a remarkably fine record of progress in 1929 and one hopes that this may be some reward for Mr. David Longden the Managing Director and his co-directors who have for so many years fought against ill-fortune until they managed to obtain recognition from the Air Ministry and to get contracts which were worth while.

Meantime, Gamecocks are being built under licence in Finland, and Gambets (ship-planes) are built in Japan.

The Halton Aero Club.

Although the Halton Club is composed of Service personnel and civil officials of the training schools for Aircraft Apprentices of the Royal Air Force, mention is made here of the Halton monoplane merely to put on record that it is another of the small monoplane type which are so popular and are helping us to progress towards cheap flying.



THE DE HAVILLAND AIRCRAFT CO. LTD.—Mr. C. C. Walker, Capt. Geoffrey de Havilland and Mr. C. Thom, —with Miss Spooner in the background.
("Aeroplane" photograph.)

The De Havilland Aircraft Co. Ltd.

To-day the name of the De Havilland Moth is probably better known all over the World than that of any other one aircraft. It has even eclipsed the name of the earlier De Havilland aircraft, of which there have been some sixty different types altogether. As late as the end of 1928 the great American Trans-Continental Air Mail Line was being operated on American-modified D.H.4 biplanes, and even to-day some of the squadrons of the R.A.F. are still equipped with De Havilland 9As. And the Air Forces of a number of nations still possess D.H.9s which have been supplied to them by the Aircraft Disposal Co. Ltd., or A.D.C. Aircraft Limited.

In spite of this world-wide use of the De Havillands, the word Moth is known probably to millions of people who do not recognise even the significance of the initials D.H. which accompany the word Moth.

The success of the De Havilland Company is due to a variety of circumstances. Primarily it is due to the fact that the management hit on a type of aircraft which the market wanted. The market may not even have known that it did want that type till the type was offered to it. That all the more shows the foresight of the De Havilland Company.

Secondly, the success of the Moth has been due to the fact that the De Havilland Co. have made a thoroughly good, very efficient and handy little machine which never lets its owners down because of any defect of the aeroplane itself.

Thirdly, the success of the Moth may be partly due to the

THE KING'S CUP WINNER.—Mr. R. L. R. Atcherley, R.A.F., and Flt. Lt. Stainforth, in the Gloster Grebe (Jaguar engine) entered by Sir Walter Preston, M.P., being led in at Heston Air-Park after winning the King's Cup Race in July last.—*("Aeroplane" photograph.)*

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fact that this type had the good fortune to be selected by the British Air Ministry as the standard type of machine with which the British Light Aeroplane Clubs were to be equipped when they first came into existence. Naturally an aeroplane which has received approval in such a way is regarded favourably by other potential buyers.

But even that free advertisement and the excellence of the machine itself and the market which was ready waiting for it would not have accounted for such all-pervading success as the Moth has had, unless the De Havilland Company itself had pushed the machine with the best business methods and some of the most brilliant advertising and general propaganda which one has met in the course of over thirty-five years' experience in business. When such a complete chain of events happen a firm is bound to succeed.

In the Moth the De Havilland Company have embodied everything from time to time which is invented to improve the machine. They started with folding wings, a very fine talking point. When slots became popular they fitted slots When a split undercarriage became popular they fitted a split undercarriage. When cabin machines began to be talked about, they fitted a lid over the seats and produced the coupé. Now that people are beginning to talk about the need for a better view owing to the crowded state of the air over popular aerodromes, they have produced a still later machine with an inverted Gipsy engine which gives an entirely different outlook for the pilot.

To give their product every chance of success the De Havilland Company have adopted the most un-to-date business methods in every way. In accord with the best motor-car practice they have started service depots. Consequently spare parts can be got with the least possible delay.

In Canada there is an enormous demand for Moths and they have set up a factory of their own where at first they have been assembling British built parts and where gradually they are making more and more of the whole machine.

In Australia there is also a subsidiary firm making its own Moths. In India there is a new branch. Another will soon start in South Africa. And Moths are built under license in the U.S.A., France, Italy, Finland, and elsewhere.

There is little need for wonder at the Moth being the most popular of civil aircraft in the world to-day. In every way it is an achievement which we, as a commercial Nation, have every reason to be proud.

But the Moth does not by any means represent the De Havilland Company's whole contribution to the progress of the world's aviation in the past year or two. The Hercules biplane with its three Jupiter engines, though it does not lift so great a pay-load as some machines of the same class, has a higher speed and is therefore better suited for the conditions under which it has to work in Australia and in Arabia, and it has been particularly successful in the hands of West Australian Airways on the Adelaide—Perth route, and in the hands of Imperial Airways Ltd., on the Cairo—Basrah route, and its extension to India.

Nor does the Moth represent the De Havilland Company's only idea for the private owner. In 1928 the Hawk-Moth was produced with the De Havilland Ghost engine which was practically two blocks of Gipsy cylinders placed in V shape. Since then the Hawk-Moth has been introduced with the Armstrong-Siddeley Lynx engine.

Thus equipped it has been sent to Canada and to Australia to be tried out under the two extreme conditions prevailing in those continents. And in each it has given a good account of itself.

Only a few days before Christmas one of the most important men in Canadian Aviation wrote to one personally saying that he had had a trip recently in the Hawk-Moth and that it seemed to him to be the best cabin monoplane he had ever flown. He said that it was more comfortable than any of its American competitors and that it gave both the pilot and the passengers a very much better view in every direction. Here again is an instance of how we can beat our competitors on their own ground, or rather in their own air, when we set about it.

The Giant Moth, otherwise known as the Canberra, which carries six passengers and a pilot, with an Armstrong Siddeley Jaguar engine, has also had considerable success in this country and in Queensland. Sir Alan Cobham has, as most people know, flown one all round England and during the Christmas holidays has flown one out to Central Africa. This is not a 1929 machine but it has helped to contribute to our successes during that year.

(To be continued.)

"DOMINION OVER PALM AND PINE."—A Metal Gipsy-Moth, flown by Mr. E. L. Capreol, Chief Pilot of The De Havilland Aircraft of Canada Ltd. De Havilland enterprise has made Moths familiar all over the World from the Equator to the Poles.

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THE NEW YEAR HONOURS.

The New Year Honours in the Royal Air Force and the Air Ministry are recorded in the R.A.F. Section of this paper.

Of them, all that need be said is that the Peerage conferred upon Sir Hugh Trenchard will give great pleasure to all concerned with and for the Royal Air Force. This is the first peerage given for air services.

There is the added satisfaction that with a seat in the House of Lords the former Chief of the Air Staff will always be at hand to voice the needs of the Air Force in any time of emergency, and to fight its political battles.

Civil Honours.

BARON:

Wakefield, Sir Charles Cheers, Bt., C.B.E., LL.D. For public and philanthropic services.

ORDER OF THE BRITISH EMPIRE:

D.B.E. (Civil Division).—Bailey, The Honourable Mary, Lady. For services to aviation.

SIR CHARLES WAKEFIELD.

Sir Charles Cheers Wakefield has been rightly called the Patron Saint of British Aviation, and everybody connected with Aviation in this country will applaud the honour which has been conferred upon him. As long ago as 1910 he addressed a public meeting in the City of London on the urgent Imperial aspects of Aviation, thus proving himself even more foresighted than many people realise.

His active support of Imperial Aviation was continued after the War when his generosity made possible Sir Alan Cobham's flight to Australia and back and later his Survey flight round Africa.

The Light Aeroplane Club movement has also received almost unlimited support from him and he has presented aeroplanes to many of these Clubs in Great Britain and the Dominions.

From the earliest days of flying he has given handsome prizes for competition in the British Empire and he has given large sums to the Royal Aero Club's Racing Fund. He also gave £5,000 towards the expenses of the Schneider Trophy Contest.

The Wakefield Scholarships have made a career in the Royal Air Force available to many young men whose parents would not otherwise have been able to afford the fees at the Royal Air Force College, Cranwell.

Sir Charles Wakefield was a keen athlete in his younger days and his activities in the ring have been most fortunately reflected in the R.A.F. by the gift of trophies and medals for competition among boxing novices in the Service.

During the summer of 1929 Sir Charles Wakefield bore the cost of free flights for 10,000 school children in the aeroplane *Youth of Britain* piloted by Sir Alan Cobham, and so helped materially Sir Alan's tour in search of suitable aerodromes for nearly a hundred cities and towns in Great Britain.

Even if all his activities for the encouragement of Aviation in this country were known, it would be impossible to enumerate them. His generosity is only equalled by his enthusiasm and his good sportsmanship.

Apart from Aviation his contributions to charity have been immense, and nobody knows how many thousands he has given secretly to deserving individuals.

LADY BAILEY.

The Honourable Lady Bailey is the wife of Sir Abe Bailey, the South African mining magnate. She is the daughter of Lord Rossmore, and was the Hon. Mary Westenra. She learned to fly at the London Aeroplane Club and bought a Moth as soon as she qualified for her license as pilot. Since then, apart from the good which her successful flight round Africa did for the cause of flying, Lady Bailey has worked indefatigably for the progress of aviation. She has visited innumerable places, and has addressed meetings of all sorts and conditions of people to spread airmindedness in this country and in the Empire.

SIR ALAN COBHAM'S VOYAGE.

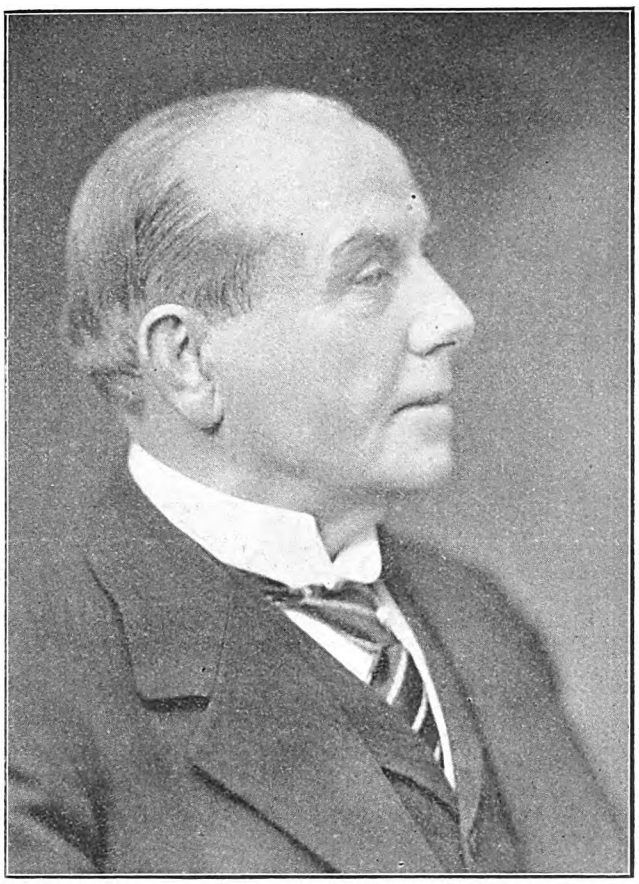
On Dec. 19 Sir Alan Cobham landed at Heliopolis, whither he had flown from Tunis by way of Tripoli and Benghazi.

On Dec. 21 Sir Alan Cobham reached Khartum. Two days later, on Christmas Eve, he arrived at Entebbe. On Christmas Day he was at Nairobi. On Dec. 26 Sir Alan started for Moshi. And on Dec. 31 he was at Ndola, Northern Rhodesia, where he was held up by floods.

A BIGGER R.101.

On Dec. 18 the Under-Secretary of State for air announced that the lift of R.101 will be increased by the insertion of a new gas-bag. This bag will have a capacity of about 500,000 cubic feet, and a new frame-section to hold it will be built into the maximum diameter of the ship.

This addition will increase the length to about 800 ft., but should not increase the drag appreciably. The lift will also be increased by letting out the netting.



OUR AVIATION PEER.—Sir Charles Cheers Wakefield, whose title as Baron is not yet known.

G.A.P.A.N. AND THE BLERIOT FILM.

The Guild of Air Pilots and Air Navigators of the British Empire has been able, by the courtesy of Mr. Alexander Duckham, to arrange for its members a private exhibition during the Christmas holidays of M. Louis Blériot's film, "25 Years of Aviation."

The show will be given on Wednesday, the 8th Jan., 1930, at 8.30 p.m. at the Theatre of the Edibel Sound Film Apparatus, 89-91, Wardour Street, W.1. The exhibition is open to members and friends without charge and children will be especially welcome.

Accommodation is limited and members are advised to make early application for seats to the Clerk of the Guild, 61, Cheapside, E.C.2, stating number of seats required.

AIR EDUCATION FOR THE YOUNG.

Readers of THE AEROPLANE who want to dispose of their young or of young relations between now and Jan. 8 certainly ought to take them to the Schoolboys' Exhibition which is being run by *The Daily Mail* at the Horticultural Hall, Westminster. There they will find an Air Section organised by the Air League which ought to keep the airminded minor interested for quite a while.

The exhibits include a number of interesting pictures, some samples of engines and various bits and pieces of aircraft. But the thing that is likely to appeal most of all is the Reid Pilot-Testing Apparatus which was such a success at the Olympia Show.

As at Olympia a competition is being run on the Reid Indicator, but this time for girls and boys. The prizes are an hour's tuition on a Moth at Stag Lane by the De Havilland Co., and an hour's tuition on a light aeroplane (make unmentioned) by Airwork Ltd. at the Heston Air Park.

Another attraction is an essay competition for young visitors to the show, on "The Importance of Imperial Air Communication." The prizes are two flights over London in an Imperial Airways' "tea-plane," and two trial flying lessons in a light aeroplane at Hanworth by National Flying Services Ltd. The essays will be judged by Sir Sefton Brancker, Director of Civil Aviation.

During the show short lectures will be given by well-known pilots, including the Honourable Lady Bailey, Colonel Bishop, V.C., Major Scott of R.34 and R.101, Mr. Hubert Broad and Colonel the Master of Sempill.

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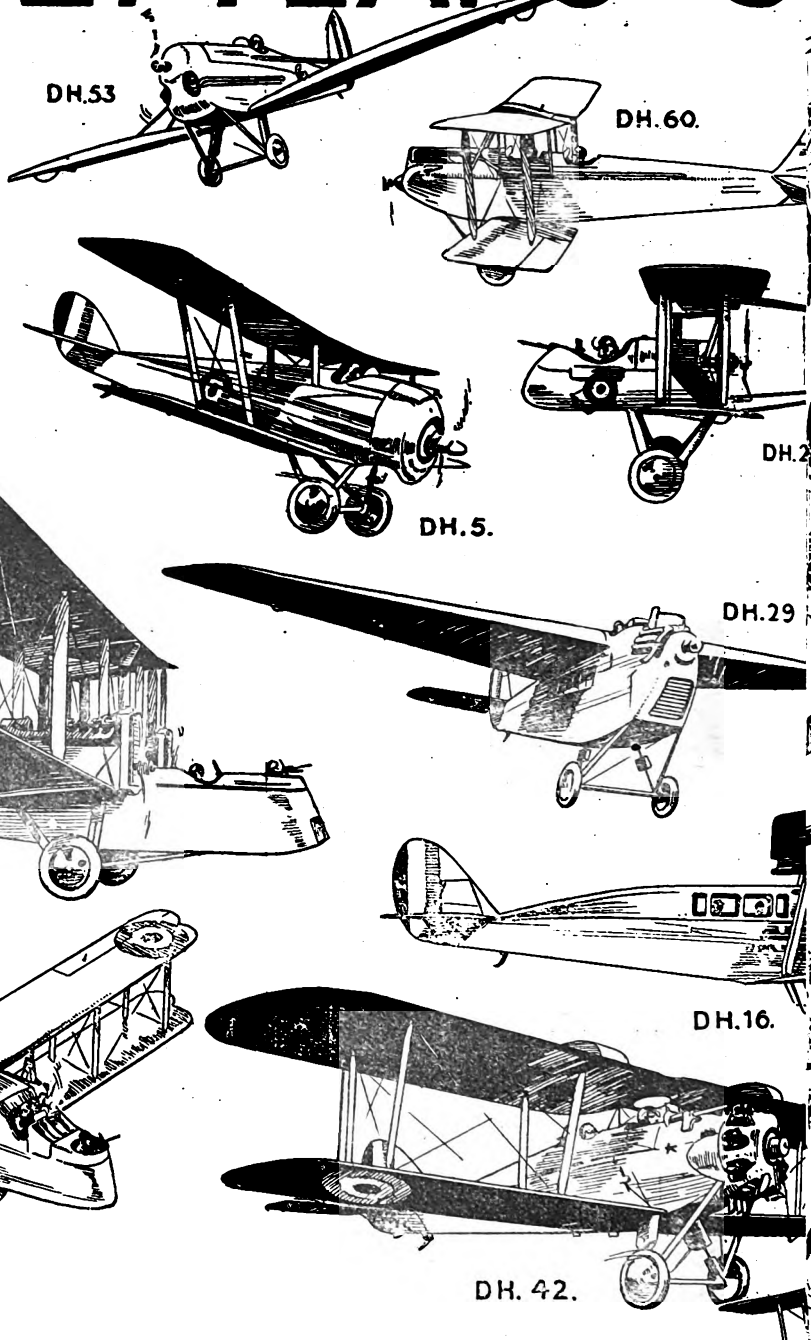
CAPTAIN GEOFFREY DE HAVILLAND, O.B.E., A.F.C., F.R.Ae.S.

21 YEARS O



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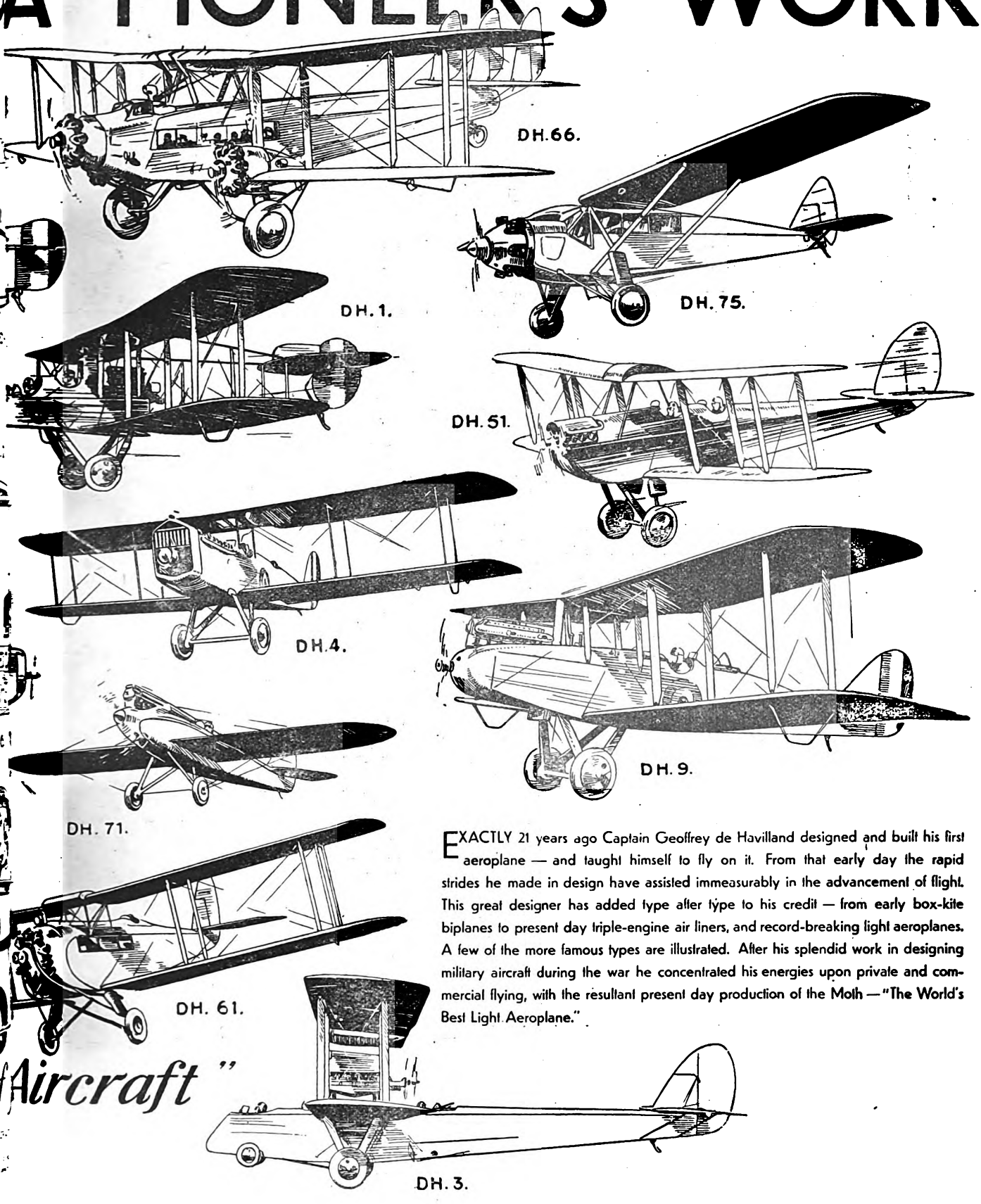
A PIONEER'S WORK



EXACTLY 21 years ago Captain Geoffrey de Havilland designed and built his first aeroplane — and taught himself to fly on it. From that early day the rapid strides he made in design have assisted immeasurably in the advancement of flight. This great designer has added type after type to his credit — from early box-kite biplanes to present day triple-engine air liners, and record-breaking light aeroplanes. A few of the more famous types are illustrated. After his splendid work in designing military aircraft during the war he concentrated his energies upon private and commercial flying, with the resultant present day production of the Moth — "The World's Best Light Aeroplane."

Aircraft"

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K·L·G

SPARKING PLUGS

SIXTEEN MILESTONES IN THE HISTORY OF THE BRITISH EMPIRE WHEREIN K·L·G PLUGS BORE THEIR PART

1916—THE BATTLE OF JUTLAND. The first time when aircraft were used to any large extent during a Naval Battle.

1918—THE MOLE AT ZEEBRUGGE. Imperishable glory won by Motor Boats.

1919—FIRST DIRECT FLIGHT ACROSS THE ATLANTIC. The late Capt. Sir John William Alcock K.B.E., D.S.C., and Lt. Sir A. Whitten Brown, K.B.E., in a Vickers-Vimy Rolls.

1919—FIRST FLIGHT FROM ENGLAND TO AUSTRALIA. Capt. Sir Ross-Smith K.B.E., M.C., D.F.C., A.M.C., and Lt. Sir K. M. Smith, K.B.E., in a Vickers-Vimy Rolls.

1919—FIRST DIRIGIBLE FLIGHT FROM ENGLAND TO NEW YORK AND BACK. H.M. Airship R34 fitted with Sunbeam-Coatalen engines.

1920—FIRST FLIGHT FROM ENGLAND TO THE CAPE.—Sir Hesperus A. van Ryneveld, K.B.E.

1924—FIRST FLIGHT FROM ENGLAND TO INDIA AND BACK. Sir Alan J. Cobham, K.B.E., A.F.C., in a D.H. 50.

1926—FIRST FLIGHT FROM ENGLAND TO THE CAPE AND BACK. Sir Alan J. Cobham, K.B.E., A.F.C., in a D.H. 50.

1926—FIRST FLIGHT FROM ENGLAND TO AUSTRALIA AND BACK. Sir Alan J. Cobham, K.B.E. A.F.C., in a D.H. 50

1926—FIRST FORMATION FLIGHT FROM CAIRO-CAPE TOWN-ENGLAND. R.A.F. Fairey, Napier-engined Seaplanes.

1928—FIRST LONE FLIGHT TO AUSTRALIA. Sqdn.-Leader Bert Hinkler, A.F.C., in an Avro-Avian.

1928—INDIA TO ENGLAND IN 4½ DAYS. Capt. C. D. Barnard in a Bristol Jupiter engined Fokker Monoplane.

1928—LARGEST FORMATION FLIGHT. Four R.A.F. Supermarine-Napier Southampton Flying Boats. England-Australia.

1929—FIRST PASSENGER AND MAIL FLIGHT TO INDIA AND BACK. Armstrong Siddeley. Imperial Airways Air Liner.

1929—FIRST NON-STOP FLIGHT ENGLAND TO INDIA. R.A.F. "Fairey," "Napier" engined Monoplane

1929—THE DUCHESS OF BEDFORD'S FLIGHT TO INDIA AND BACK. Capt. C. D. Barnard piloting a Bristol Jupiter engined Monoplane.

ALL WERE AVAILABLE — K·L·G's WERE CHOSEN

K·L·G SPARKING PLUGS, LTD., PUTNEY VALE, LONDON, S.W.15.

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THE ROYAL AIR FORCE.

The London Gazette.

Air Ministry, December 24.

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—The following Plt. Offs. are promoted to the rank of Flg. Off.:—E. S. Greenwood (Oct. 8); H. Kerr (Oct. 13); J. Cox (Nov. 25).

Group Capt. P. L. W. Herbert, C.M.G., C.B.E., is placed on the retired list at his own request and is granted permission to retain the honorary rank of Air Commodore (Dec. 3).

ACCOUNTANT BRANCH.—Flt. Lt. R. M. Grundy is placed on the retired list at his own request (Dec. 19).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—M. J. Cresswell is granted a comn. in Class A.A. (ii) as a Plt. Off. on probation (Dec. 11). The following Flg. Offs. relinquish their comns. on completion of service:—A. E. T. Bruce (Dec. 2); J. J. B. Rutter (Dec. 23). Plt. Off. J. H. Thomson resigns his comn. in the Special Reserve (Dec. 10).

MEDICAL BRANCH.—Flt. Lt. G. Kinneir relinquishes his comn. on completion of service (Dec. 19).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 603 CITY OF EDINBURGH (BOMBER) SQUADRON.—Flg. Off. T. Usher resigns his comn. (Dec. 9).

December 31, 1929.

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—Marshal of the Royal Air Force Sir Hugh M. Trenchard, Bt., G.C.B., D.S.O., D.C.L., LL.D., relinquishes his appointment as Chief of the Air Staff and Member of the Air Council (Jan. 1).

Air Chief Marshal Sir John M. Salmond, K.C.B., C.M.G., C.V.O., D.S.O., Principal Air Aide-de-Camp to the King, is appointed Chief of the Air Staff (Jan. 1).

Air Vice-Marshal T. I. Webb-Bowen, C.B., C.M.G., is appointed a Member of the Air Council as Air Member for Personnel (Jan. 1).

Wing Commander P. C. Maltby, D.S.O., A.F.C., is appointed Director of Training (Temporary), Air Ministry, from Sept. 7, 1929, to Oct. 3, 1929, inclusive.

Marshal of the Royal Air Force Sir Hugh M. Trenchard, Bt., G.C.B., D.S.O., D.C.L., LL.D., on ceasing to be employed, is placed on half-pay (Jan. 1).

Group Capt. A. B. Burdett, D.S.O., is placed on the half-pay list, scale A (Jan. 1).

Air Vice-Marshal F. C. Halahan, C.M.G., C.B.E., D.S.O., M.V.O., is placed on the retired list at his own request (to accelerate promotions) (Jan. 1).

Sq. Ldr. A. J. Currie is placed on the retired list (Dec. 30, 1929). Flt. Lt. F. L. Woledge resigns his S.S. comn. (Dec. 31, 1929). Flg. Off. F. B. Tomkins is transferred to the Reserve, Class A (Dec. 23, 1929).

The S.S. comns. of the following Plt. Offs. on probation are terminated on cessation of duty:—G. L. S. Marsh (Dec. 31, 1929); R. R. Chapman (Jan. 1). Flg. Off. J. L. B. Stevinson (Lt., R. Tank Corps) relinquishes his temp. comn. on return to Army duty (Dec. 18, 1929); Lt. H. R. M. Nicholl, R.N., Flg. Off., R.A.F., relinquishes his temp. comn. on return to Naval duty (Dec. 30, 1929); Lt. E. O. F. Price, R.N., Flg. Off., R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (Dec. 9, 1929).

STORES BRANCH.—Sq. Ldr. C. M. Bevan is placed on the retired list at his own request (Jan. 1); Flg. Off. H. O. Fellowes is cashiered by sentence of General Court-martial (Dec. 18, 1929).

MEDICAL BRANCH.—Flg. Off. T. A. Edwards, M.B., resigns his S.S. comn. (Dec. 31, 1929); Flt. Lt. A. W. Comber relinquishes his temp. comn. on completion of service (Nov. 20, 1929).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—The following are granted comns. in the Special Reserve as Plt. Offs. on probation:—C. W. Lindsay (Nov. 8, 1929); F. B. Bristow (Nov. 13, 1929).

The Half-Yearly Promotion List.

Air Ministry, January 1, 1930.

The following promotions are made with effect from Jan. 1, 1930:—

GENERAL DUTIES BRANCH.

AIR COMMODORES TO AIR VICE-MARSHALS.—Edgar Rainey Ludlow-Hewitt, C.B., C.M.G., D.S.O., M.C.; Arthur Murray Longmore, C.B., D.S.O.; Cyril Louis Norton Newall, C.B., C.M.G., C.B.E., A.M.

GROUP CAPTAINS TO AIR COMMODORES.—Patrick Henry Lyon Playfair, M.C.; Arthur Wellesley Bigsworth, C.M.G., D.S.O., A.F.C.; William Foster MacNeece Foster, C.B.E., D.S.O., D.F.C.

WING COMMANDERS TO GROUP CAPTAINS.—Reynell Henry Verney, O.B.E.; Lawrence Arthur Pattinson, D.S.O., M.C., D.F.C.; Robert John Ferguson Barton, O.B.E.; William Lawrie Welsh, D.S.C., A.F.C.; Hugh Lambert Reilly, D.S.O.; John Tremayne Babington, D.S.O.; Eric Mackay Murray, D.S.O., M.C.; Victor Osborne Rees, O.B.E.

SQUADRON LEADERS TO WING COMMANDERS.—Reginald Blayney Bulteel Colmore, O.B.E.; Reginald Stuart Maxwell, M.C., D.F.C., A.F.C.; Percy Clark Sherren, M.C.; Hugh Vivian Champion de Crespigny, M.C., D.F.C.; Charles Henry Elliott-Smith, A.F.C.; John Cannan Russell, D.S.O.; Anthony Rex Arnold, D.S.C., D.F.C.; Charles Joseph Mackay, M.C., D.F.C.; Alexander Gray, M.C.; Ronald Graham, D.S.O., D.S.C., D.F.C.; Robert Dickinson Oxland, O.B.E.; Horace Percy Lale, D.S.O., D.F.C.

FLYING OFFICERS TO FLIGHT LIEUTENANTS.—Herbert Stafford; George Gerald Mobsby; Thomas Henry Moon; Christopher Herbert Schofield (Lt., Welch Regt.).

LIEUTENANT-COMMANDER, R.N., FLYING OFFICER, R.A.F., TO FLIGHT LIEUTENANT.—Henry Lockhart St. John Fancourt.

LIEUTENANTS, R.N., FLYING OFFICERS, R.A.F., TO FLIGHT LIEUTENANTS.—Cyril Bristowe Tidd; Robert Godmond Poole.

STORES BRANCH

WING COMMANDER TO GROUP CAPTAIN.—William Robert Bruce, O.B.E.

SQUADRON LEADERS TO WING COMMANDERS.—Walter John Brice Curtis, O.B.E.; William Edgar Aylwin, O.B.E.; Henry Lumsden Crichton, M.B.E.

FLIGHT LIEUTENANTS TO SQUADRON LEADERS.—Arthur Thomas Cooper; Arthur Benjamin Wiggin; Ernest William Crosbie; Arthur Myrtle Saywood.

FLYING OFFICERS TO FLIGHT LIEUTENANTS.—John Gordon Smithson; Francis David Darley Gaussen; George Godfrey Caledon Pigott; Cecil William Rugg; Charles Norman Scott; George William Longstaff; William Bourne.

ACCOUNTANT BRANCH.

SQUADRON LEADER TO WING COMMANDER.—Percy John Wiseman.

FLIGHT LIEUTENANT TO SQUADRON LEADER.—Ralf Harry Cleverly.

FLYING OFFICERS TO FLIGHT LIEUTENANTS.—Frederick John Sharer Short; John James Taylor Rose; Robert William Lowry Glenn; William Reginald Donkin; Desmond Frederick Aubrey Clarke; Sidney Charles Wyatt; Arthur Edward West; Gilbert Goodall.

MEDICAL BRANCH.

SQUADRON LEADER TO WING COMMANDER.—Thomas James Kelly, M.C., M.D., M.A.

PRINCESS MARY'S R.A.F. NURSING SERVICE.

SENIOR SISTER (ACTING MATRON) TO MATRON.—Miss Emily Mathieson Blair.

SISTER TO SENIOR SISTER.—Miss Winifred Maud Coulthurst.

SISTER TO ACTING SENIOR SISTER.—Miss Margaret Watt Walker.

The New Year Honours.

The New Year Honours List of 1930 includes the following R.A.F. personnel and Air Ministry officials:—

BARON:

Trenchard, Marshal of the Royal Air Force Sir Hugh Montague, Bt., G.C.B., D.S.O. Chief of the Air Staff since 1919. Colonel, Royal Scots Fusiliers.

ORDER OF THE BATH:

C.B. (Military Division).—Mills, Air Commodore Reginald Percy, M.C., A.F.C., Royal Air Force.

ROYAL VICTORIAN ORDER:

M.V.O. (Fourth Class).—Don, Sq. Ldr. David Sigismund, R.A.F.

BRITISH EMPIRE MEDAL (MILITARY DIVISION).

For Meritorious Service.—336698 Sjt. (Pilot) Maurice Edward Hearn, Royal Air Force.

ORDER OF THE BRITISH EMPIRE:

C.B.E. (Civil Division).—Caldwell, Lieutenant-Colonel Alexander Francis Somerville, D.S.O., Principal Education Officer, Air Ministry.

O.B.E. (Civil Division).—Liptrot, Captain Roger Norman, A.F.R.Ae.S., M.I.Ae.E., Principal Technical Officer, Air Ministry.

M.B.E. (Civil Division).—Tarrant, Henry Lester Butler, Esq., Chief Clerk, Meteorological Office, Air Ministry.

Awards.

The King has been graciously pleased to approve of the following awards to the undermentioned officers and airman of the Royal Air Force:—

Awarded a Bar to the Air Force Cross.—Flt. Lt. Edward Goodwin Hilton, D.F.C., A.F.C.

Awarded the Air Force Cross.—Flt. Lt. John McFarlane, M.C.

Awarded the Air Force Medal.—87076 F-S. Joseph Edgar Brown.

The Air Council.

The Air Ministry announces that the following appointment will take effect from Jan. 1, 1930:—Air Vice-Marshal Cyril Louis Norton Newall, C.B., C.M.G., C.B.E., A.M., Deputy Chief of the Air Staff, to be an additional Member of the Air Council.

A New Command.

A new R.A.F. Command, to be known as the Far East Command, has been formed with effect from Jan. 1, 1930. The Command has its headquarters at Singapore and will include the R.A.F. Bases at Singapore and Kai Tak (Hong Kong).

The C.O., R.A.F., Far East, will stand in the same relation to the Fleet Air Arm units in his command, when embarked, as does the A.O.C., Coastal Area, to such units at home.

The Long-Distance Record Attempt.

Mr. F. Rowarth, of the Research and Development of Aircraft Department of the Air Ministry, reached Tunis on Dec. 22 and went to Jebel-Zit, where the wreckage of the Fairey Long Range Monoplane is lying, to inquire into the causes of the accident in which Sq. Ldr. Jones-Williams and Flt. Lt. Jenkins lost their lives. Wing Cdr. E. Osmond,

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C.B.E., Chief Staff Officer, R.A.F. Mediterranean Command, left Malta on Dec. 23 for Tunis to meet Mr. Rowarth.

A memorial service for Sq. Ldr. Jones-Williams and Flt. Lt. Jenkins was held at Tunis on Dec. 20. It was attended by the chief authorities of the Protectorate, the British Consul-General and the members of the British colony. Military honours were rendered by a guard of honour of the 4th Regiment of African Chasseurs, the band of the 4th Zouave Regiment, a composite battalion of Zouaves and Senegalese, and a company of the French Air Service. The coffins were later embarked on a mail-boat for transport to England.

Cadets for Cranwell.

The following are declared by the Civil Service Commissioners to be the successful candidates at the competitions held in November and December for cadetships in the R.A.F.

Their admission is conditional on their having passed a medical examination. The names are in order of merit:—

Mills, G. H. O.; Forsyth, R. C. R.; Leigh, R. H. A.; Goodman, N. G.; Emson, R. H. E.; Chadd, J. S.; Jenkins, H. P.; Elsner, L. N.; Williams, M. F. D.; Langston, S. P.; Gully, B. H.; Gomez, P. S.; Parselle, T. A. B.; Teesdale Smith, H; Sutcliffe, W. P.; Whitworth, J. N. H.; Bradley, J.; Tyson, F. H.

Beresford-Peirse, F. C. de la P.; Gillan, D. H. D.; Geoghegan, A. W.; Johnson, D. V.; Glencross, A. R.; Humphreys, H. Y.; Gosnell, R. J.; Montagu, G. W.; Doran, A. M.; Barnett, R. E.; Worral, J.; Presland, R. J.; Jewson, W. S.; Hamilton, M. B.

Air Vice-Marshal Halahan.

Air Vice-Marshal Frederick Crosby Halahan, C.M.G., C.B.E., D.S.O., M.V.O., who retired from the Royal Air Force on Dec. 31, 1929, was born in 1880, the fifth son of the late Colonel S. H. Halahan of Chiddingford. Of his four brothers, one, Capt. H. C. Halahan, V.C., R.N., was killed in the attack on Zeebrugge, and another, Grp. Capt. J. C. Halahan, C.B.E., A.F.C., retired from the R.A.F. in 1927. He was educated at Dulwich College, at the R.N. School at Eltham and in H.M.S. *Britannia*.

He entered the Royal Navy as a midshipman in 1896 and was promoted sub-lieutenant in 1899 and lieutenant in 1900. He joined H.M.S. *Immortalité* at Hong Kong in January 1896 and was in that ship at Manilla, Philippine Islands, during the Spanish-American War. In January 1899 he joined H.M.S. *Edgar*, which ship lost her funnel off the Spanish coast in a hurricane. In March 1899 he joined H.M.S. *Cleopatra* of the Sailing Training Squadron. During the year 1900 when he was at Greenwich and Portsmouth qualifying he obtained five first-class certificates and was given Rugby colours for the R.N.C. Greenwich and for the United Services, Portsmouth.

He returned to Greenwich in 1903 to qualify in gunnery. In 1904 he joined H.M.S. *Excellent* as Junior Staff Officer and in 1905 he joined H.M.S. *Victorious*, Flagship of Rear Admiral Francis Bridgeman, in the Atlantic Fleet. In June 1905 Lieutenant Halahan was blown up in a gun explosion in H.M.S. *Magnificent* when acting as umpire for that ship's gunlayer tests and spent three months in Gibraltar Hospital.

In August 1906 he was transferred to Portsmouth to build H.M.S. *Dreadnought*, the first all-big-gun ship, as Gunnery Lieutenant. During 1907 he did firing-tests of the 12 in. guns with H.M. King Edward, Queen Alexandra, and the Prince of Wales (now King George V.) on board, and was created a Member of the Victorian Order 5th Class. In September 1907 he joined the School of Gunnery, Sheerness, for the Military Gunnery Staff Course.

In 1908 he was promoted Lieutenant Commander, R.N., and joined H.M.S.*Cochrane* as 1st and Gunnery Lieutenant.

In 1910 he joined H.M.S. *Commonwealth* and in 1911 he joined H.M.S. *Excellent*. In 1912 he was posted to Chatham during the building of H.M.S. *Chatham*, and served in her until 1913, when he was posted to the Admiralty.

He was on the half-pay list during the first part of 1914 but on the outbreak of War was sent to Liverpool to fit out armed merchant cruisers. In September 1914 he was appointed to the Air Department, Admiralty, in charge of the anti-aircraft defence of London.

While he was at the Admiralty Lt.-Comdr. Halahan with the late Air Commodore Groves spent their lunch hours at Hendon learning to fly under Mr. Merriam. His Royal Aero Club certificate, No. 1169, is dated April 12, 1915, and the machine on which he qualified was a Maurice Farman Longhorn.

In November, 1915, he was appointed to the Air Department, Admiralty, in charge of the Armament Section, and was relieved in command of the London Air Defence by Admiral Sir Percy Scott. He was then given the rank of Wing Commander, Royal Naval Air Service.

In April 1916 he proceeded to France as Chief Staff Officer and second-in-command to Capt. C. L. Lambe, R.N., at Dunkirk, who was then in charge of R.N.A.S. Units at Dover and Dunkirk under Vice-Admiral Bacon of the Dover Patrol.

In June 1917 he was promoted Commander R.N. and Wing Captain, R.N.A.S. He was Mentioned in Despatches (France) in 1917 and (Dover Patrol) in 1918.

In January 1918 he was appointed to be a Companion of the Distinguished Service Order for valuable services in connection with the War.

On the formation of the Royal Air Force in April 1918 he was appointed to command the 5th Group, R.A.F., with the temporary rank of Colonel, and retained that appointment until the Armistice.

In October 1918 he was made an Officer of the Legion of Honour (France) for distinguished services rendered during the War. In February 1919 the Belgian Order of the Crown (Commandant) and the Belgian Croix de Guerre were conferred on his personally by the King of the Belgians for valuable services rendered in connection with the War. In the King's Birthday Honours of 1919 he was made a Companion of the Order of St. Michael and St. George in recognition of distinguished services rendered during the War.

From December 1918 until June 1919 he commanded No. 7 Group, R.A.F., at Salisbury, with the rank of Group Captain.

In June 1919 he was appointed Deputy Director of Equipment at the Air Ministry.

In January 1921 he was promoted Air Commodore and shortly afterwards was appointed Director of Aeronautical Inspection at the Air Ministry. In 1923 he was appointed Director of Technical Development at the Air Ministry.

In the King's Birthday Honours of 1923 he was made a Commander of the Order of the British Empire (Military Division).

In November 1926 he was appointed Air Officer Commanding R.A.F. Cranwell and Commandant of the R.A.F. Cadet College. In July 1928 he was promoted Air Vice-Marshal.

Air Vice-Marshal Halahan married in 1905, Eva Muriel Groves, daughter of the late J. Grimble Groves, D.L., J.P., and sister of the late Air Commodore R. M. Groves, C.B.E.

—C. M. MCA.

Midshipmen for the Air.

A recent Fleet Order states that every effort is to be made to ensure that all midshipmen undergo the junior officers' air course while holding that rank.

The names of those who are unable to do so are to be specially reported to the Admiralty on discharge to shore courses, in order that arrangements may be made for them to undergo the course after appointment to sub-lieutenant.

H.M.S. "Glorious."

On commissioning for sea trials on Jan. 7, 1930, H.M.S. *Glorious* will become an independent command.

H.M.S. *Glorious* is the last of the large cruisers built during the War which have been converted into aircraft carriers. The others are H.M.S. *Courageous* and H.M.S. *Furious*.

H.M.S. *Glorious* will be made up to full complement on February 1924 and will join the Mediterranean Fleet at the end of June, when she will replace H.M.S. *Courageous*, which will replace H.M.S. *Argus* with the Atlantic Fleet.

The Senior Air Force Officer in H.M.S. *Glorious* is Wing Cdr. B. L. Huskisson, D.S.C.

An Acquittal.

At the Buckinghamshire Quarter Sessions, at Aylesbury, on Dec. 31, the trial was concluded of Flt. Lt. Frank Reginald Barton, third officer in the Accounts Department, R.A.F., Halton Camp, on indictment charging him with stealing £24 7s. 6d. and £100 in notes from the Accounts Department.

The jury returned a verdict of Not Guilty, and Flt. Lt. Barton was discharged.

Service Equipment.

In the House of Commons on Dec. 24 Capt. Harold Balfour asked the Under-Secretary of State for Air whether any war-time designed aircraft of the De Havilland 9a and Bristol Fighter types were still in use in Service Squadrons and Instructional Units of the Royal Air Force, and if so, when it was expected that the last machines of these types would be struck off the strength of these Units and replaced by aircraft of modern design.

Mr. Montague said that a certain number of D.H.9a and Bristol Fighter aircraft were still in use, but both types had been so continuously developed and improved that they now differed greatly from the war-time aircraft of the same names. It was hoped to substitute new types of aircraft for all D.H.9a's by the end of 1930 and for all Bristol Fighters by the end of 1932.

Captain Balfour asked for assurance that whatever economies might be instituted in the Services nothing should be allowed to interfere with this vital replacement programme.

Mr. Montague said that the question did not arise out of the original question.

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THE ROYAL AIR FORCE IN 1929.

BY C. M. MCALERY.

At the beginning of the year the Royal Air Force in India, under the command of Air Vice-Marshal Sir W. G. H. Salmond, K.C.B., K.C.M.G., D.S.O., Air Officer Commanding, R.A.F., India, were engaged in the Air Operations in Afghanistan which resulted in the successful evacuation from Kabul of 586 men, women and children. The operations began on Dec. 23, 1928, and by the end of that year 127 people had been evacuated. The final evacuation was on Feb. 25 when the last aeroplane conveyed Sir Francis Humphreys, the British Minister in Kabul, to Peshawar.

The R.A.F. flew a total of 28,160 miles in the actual performance of evacuations. Including the journeys of the reinforcement machines which came from 'Iraq, and the flights in the opening stages of the operations and the flights in connection with the evacuation of Flt. Lt. Chapman and Flg. Off. Davies, the two officers who had a forced landing at Charbagh, a total of 57,438 miles was flown. The flights were over mountains averaging 10,000 feet in height, during one of the severest winters on record, and over country which afforded very few opportunities of making a successful forced landing.

Only one machine was lost during the operations and throughout the whole period communication with Kabul was maintained by the R.A.F.

At the conclusion of his Report on the history of the operations, Air Vice-Marshal Sir Geoffrey Salmond wrote:

> I submit that the history of these evacuations constitutes a record with which the Royal Air Force can be justifiably satisfied. The efficiency and determination of the officers, non-commissioned officers and men were well tested, and I am proud to record that they were not found wanting.

On Feb. 26, His Majesty the King sent the following message to the Royal Air Force, his first public message after his long and dangerous illness:—

> I heartily congratulate the Royal Air Force on the great feat of rescuing so many men, women and children from Kabul in spite of the many difficulties in the air and on the ground.

THE HIGHER COMMAND.

The vacancy on the Air Council caused on Jan. 1 by the retirement of Air Vice-Marshal Sir Philip Game was filled by the appointment of Air Chief Marshal Sir John Salmond to be Air Member for Personnel. On the same date Air Vice-Marshal Sir Edward Ellington was appointed to command the Air Defence of Great Britain and Air Vice-Marshal F. R. Scarlett was appointed to command the Fighting Area.

At the end of the year the retirement from the Service was announced of Marshal of the R.A.F. Sir Hugh Trenchard, Chief of the Air Staff, Air Vice-Marshal Sir Oliver Swann, Air Vice-Marshal C. A. H. Longcroft, Air Vice-Marshal F. C. Halahan. Air Commodore B. C. H. Drew, Air Commodore C. R. Samson, and Air Commodore E. L. Gerrard also retired towards the end of 1929.

On Dec. 15 Air Commodore A. M. Longmore was appointed Air Officer Commanding, R.A.F. Cranwell, and Commandant of the Royal Air Force College

At the end of the year Sir John Salmond became Chief of the Air Staff in succession to Sir Hugh Trenchard.

In August Squadron Leader the Lord Edward Grosvenor died and was succeeded in the command of No. 601 (County of London) (Bomber) Squadron, Auxiliary Air Force, by the Right Hon. Sir Philip Sassoon, whose appointment as Under-Secretary of State for Air ceased with the defeat of the Government in the General Election.

OPERATIONS AND EXERCISES.

The Service annual flight to the Cape and back, with co-operation with the South African Air Force and with the King's African Rifles, was made in February and March by a Flight of four machines of No. 47 (Bomber) Squadron commanded by Sq. Ldr. C. R. Cox, A.F.C. On the return journey one of the machines crashed and the pilot and observer were killed

No. 203 (Flying Boat) Squadron flew from Cattewater, Plymouth, to its new station at Basrah at the end of February.

During March the aircraft-carriers, *Courageous, Eagle,* and *Furious* took part in the Combined Exercises in the Mediterranean.

On April 24 and 25 the R.A.F. Long Range Monoplane piloted by Sq. Ldr. A. G. Jones-Williams, M.C., with Flt. Lt. N. H. Jenkins, O.B.E., D.F.C., D.S.M., as second pilot, flew from Cranwell to Karachi, non-stop, a distance of 4,130 miles in 50 hours 48 minutes.

Raiding tribes in Trans-Jordan were dispersed by R.A.F. Armoured Cars in May.

In July the aircraft-carrier *Eagle* rescued the machine and crew of the Spanish Dornier Wal flying-boat *Numancia* which had been forced to alight in the open sea in an attempt to cross the Atlantic.

A serious outbreak of disorder in Palestine occurred in August and troops were rushed to Jerusalem from Cairo in R.A.F. troop-carrying aeroplanes. Troops were also brought from Malta in the aircraft-carrier *Courageous.* Two Flights of No. 45 (Bomber) Squadron were drafted from Helwan, Egypt, to reinforce No. 14 (Bomber) Squadron in Palestine, and several Flights of the Fleet Air Arm were landed at Haifa. R.A.F. armoured car Units and other R.A.F. personnel were also active during the disturbance.

At the end of August, Lord Thomson, who had been appointed Secretary of State for Air in the new Government, made a tour of Service Stations in the Home commands, using Service air transport for the tour.

Minor air operations during the Summer included some fishery-protection patrols by flying-boats from Felixstowe, the maintenance of communication between Aden and a wrecked Greek steamer off Ahwar and a flight of two R.A.F. machines from Risalpur to Calcutta to fetch special drugs for the heir presumptive to the throne of Bangkok who was dangerously ill. The R.A.F. had been asked to fly these drugs to Bangkok but happily they were not needed.

Successful demonstration flights were made by No. 8 (Bomber) Squadron over the disaffected tribes in Assauda, Arabia.

Seaplane trials were made with Fairey III.Fs on floats in the swamp districts of the southern Sudan.

During August and September No. 205 (Flying Boat) Squadron made cruises over the proposed air mail route from Calcutta and Singapore to gain practical experience of the weather conditions during the monsoon period.

Early in October two flying-boats from Felixstowe flew to Norway and back for a short routine cruise.

The annual West African flight was made by a Flight of No. 47 (Bomber) Squadron under Sq. Ldr. F. J. Vincent. The flight began on Oct. 19 and returned to Helwan according to plan on Oct. 29.

A second attempt on the World's Long Distance Record was made on December 17, when Sq. Ldr. Jones Williams and Flt. Lt. Jenkins left Cranwell in the R.A.F. Long Range Monoplane. The machine crashed near Tunis and both the pilots were killed

In February the title of the R.A.F. Cadet College was changed to the Royal Air Force College and in April the foundation-stone of the new College building was laid by the Lady Maud Hoare, D.B.E.

During the year H.R.H. the Prince of Wales, H.R.H. Prince George, and the Prime Minister made use of Service air transport in order to fulfil public engagements.

In June a new grading of Flying Instructors was introduced and in December a revised Royal Warrant was issued governing the award of Royal Air Force decorations.

NEW UNITS AND EQUIPMENT.

The Air Estimates in March 1929 allowed for one new Regular squadron, one Cadre squadron, three Auxiliary squadrons, two flights for the Fleet Air Arm and one Unit of Flying Boats. Two new Squadrons were formed in January,—which came into the previous financial year. They were No. 33 (Bomber) Squadron, and No. 35 (Bomber) Squadron which were formed to replace the two Squadrons taken from the Air Defence of Great Britain Command in 1928 and sent to India.

The new Cadre Squadron (Special Reserve) was formed at Filton in July and named No. 501 (Bomber) Squadron.

The new Flying-Boat Unit was No. 204 (Flying-Boat) Squadron formed at Cattewater to replace the Flying-Boat Squadron sent to Basrah.

A new Coast Defence Co-operation Flight was formed at Eastchurch during the year. A new Fleet Fighter Flight, No. 408 was formed at Donibristle. A new Station Flight was formed at Andover.

Four Flying-Boat Flights were renumbered as Squadrons.

New Stations were opened during the year at Catfoss (air gunnery and bombing range); Filton (No. 501 Squadron); Ismailia (No. 6 (Army Co-operation) Squadron); Kai Tak, Hong Kong (R.A.F. Base), and Novar, Scotland. The Stations at Ascot, Ickenham and Flowerdown were closed.

Several Squadrons were re-equipped during the year. No. 3 (Fighter) Squadron, and No. 17 (Fighter) Squadron are now equipped with Bristol Bulldogs (Jupiter engine). No. 11 (Bomber) Squadron, which had Horsleys and No. 30 (Bomber) Squadron and No. 39 (Bomber) Squadron, both of which had D.H.9a's, have all been equipped with Westland Wapitis (Bristol Jupiter engine). No. 45 (Bomber) Squadron, formerly 9as, has Fairey III.Fs. No. 4 (Army Co-operation) Squadron now has Armstrong Whitworth Atlases (Armstrong Siddeley Jaguar engine). No. 99 (Bomber) Squadron has had its Hyderabads exchanged for Hinaidis. Among the Auxiliary Squadrons, No. 600 and No. 601, the two London Squadrons, have had Westland Wapitis (Bristol Jupiter engine) added to their equipment.

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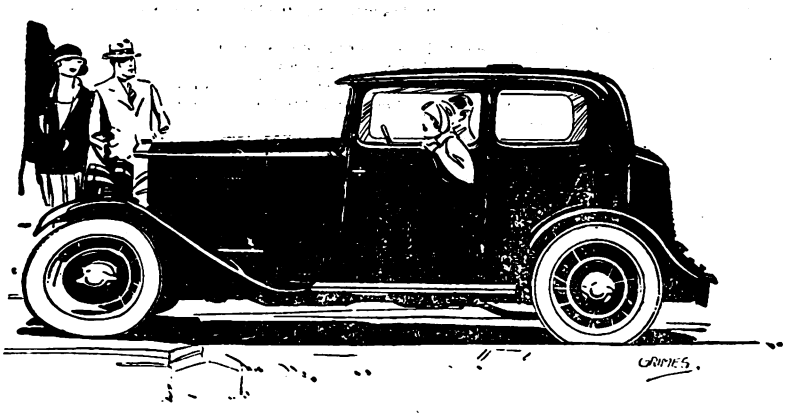

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MOVEMENTS.

The Electrical and Wireless School has moved to Cranwell from Flowerdown.

No. 33 (Bomber) Squadron has moved from Eastchurch to Netheravon.

No. 6 (Army Co-operation) Squadron has moved from Mosul, 'Iraq, to Ismailia, Egypt.

No. 30 (Bomber) Squadron has moved from Hinaidi to Mosul.

No. 203 (Flying Boat) Squadron has moved from Cattewater to Basrah.

DISPLAYS AND COMPETITIONS.

The R.A.F. held its annual Display at Hendon on July 13 in the presence of H.R.H. the Prince of Wales and a record number of spectators. The standard of skill and precision was maintained at the high level set in previous Displays. This year there was no enclosure for new and experimental types as these were being shown the next week at Olympia on the stands of their manufacturers.

Minor Displays were held at Heliopolis in February and at Andover on July 5. Royal Air Force assistance was also given at several of the Flying Club and Municipal Flying Meetings.

In connection with the R.A.F. Display the Fighter aerobatics competition was won by No. 23 (Fighter) Squadron.

A Royal Air Force team won the Schneider Trophy at Calshot on Sept. 6 and 7. The actual winner of the Trophy, Flg. Off. H. R. D. Waghorn, flew the course at an average speed of 328 m.p.h. He was awarded the Air Force Cross.

On Sept. 12, Sq. Ldr. A. H. Orlebar, A.F.C., R.A.F., flying the Supermarine-Rolls-Royce S.6 in which Flg. Off. Waghorn had won the Schneider Trophy, put up a new world's Speed Record at an average speed of 357.7 m.p.h. On the previous day Flt. Lt. Stainforth had put up the Speed Record in the Gloster VI.

An Air Display was given over Constantinople in October by the R.A.F. Units in H.M.S. *Courageous*.

The Sassoon Trophy Race and Competition for Fighter Squadrons was won by No. 56 (Fighter) Squadron, which Squadron also won the Map Reading Competition for a Trophy presented by Sir Philip Sassoon.

No. 14 (Bomber) Squadron, Palestine, won the Lord Lloyd Reliability Competition for Units in the Middle East.

No. 602 (City of Glasgow) Squadron won the Esher Trophy for efficiency in Squadrons of the Auxiliary Air Force.

THE PERSONNEL.

The total strength of the Royal Air Force has increased slightly during the year, the total strength of all ranks of the regular air force being about 300 more than the previous year.

The reduction in the number of fatal accidents since last year has been most marked. In 1928 there were 49 accidents involving 74 deaths. In 1929 there were 29 accidents involving 40 deaths.

During the year fifteen lives have been saved in the R.A.F. by the use of the Irvin parachute, which is standard equipment in all Service aeroplanes.

SPORTS AND ATHLETICS.

In Inter-Service Sports the year has not been a particularly good one. At Rugby Football the R.A.F. lost to the Army and the Navy. At Association Football they beat the Navy and lost to the Army. At Cricket they drew with the Navy and lost to the Army. At Hockey they lost to the Navy and drew with the Army. At Fencing they beat both the Army and the Navy. At Golf they lost to the Navy and beat the Army. At Water Polo they drew with both the other Services.

In Triangular Contests they were first in Cross-Country, second in Athletics and Squash Rackets, and third in Tennis and Swimming.

The Home Aircraft Depot at Henlow won the Rugby Football Cup, the Association Football Senior Cup and the King's Cup for Athletics.

No. 4 Flying Training School, Abu Sueir, Egypt, won the Egypt and Sudan Shooting Trophy for the second year in succession.

AMERICAN AIRCRAFT CARRIERS.

The U.S. Navy Department has completed plans for a new aircraft carrier which was authorised under the recent Fifteen-Cruiser Bill. This ship will be of 14,000 tons displacement as compared with the 33,000 tons of the *Lexington* and *Saratoga*.

In the meantime a new use has been found for the *Lexington*. Owing to a drought the cities of Seattle and Tacoma, Wash., are without hydro-electric power and permission has been granted for the *Lexington* to wire up to the shore to supply power from its generators, which have a capacity of 180,000 h.p.

A TRIBUTE.

The following letter appeared in *The Times* of Jan. 1:—

Sir,—The New Year brings with it a change that deserves peculiar notice. Sir Hugh Trenchard ceases after eleven years to be Chief of the Air Staff, and Sir John Salmond succeeds him.

So long a period of responsibility in a high and difficult post must be exceptional in the history of the Services, but it is not for mere length of office that Sir Hugh will be chiefly remembered. No Chief of Staff has ever been faced with problems so various, so new, and so complex. What use should be made of the new arm in war? What machines and engines should be used and how should pilots be trained? How should the Air Force be organised, and what should be its relations to the older Services? Questions such as these had to be decided, and to be decided in the heat of war. When peace came the problems for settlement were no less urgent and difficult. What should be the peace time strength of a Force that had been formed upon the temporary basis of war-time needs? Should the Air Service continue to maintain the independence that the experience of the War had necessitated? How should a sufficiency of flying officers be maintained? How was the money to be found simultaneously for new units, new machines, and permanent buildings? How, above all, was the Air Force to be fitted into our scheme of Imperial defence in such a way as to save money and at the same time to increase our security?

These questions, though they by no means complete the list of Air Force problems, need to be enumerated, for they show the magnitude of the task with which the Chief of the Air Staff was confronted. A weaker man would have shirked many of them, a smaller man would have faced them with the narrow mind of a partisan. With a singleness of purpose that has endeared him even to his strongest opponents and with a dogged persistency that has never admitted defeat Sir Hugh has worked steadily through them, and built upon their answer the permanent foundations for future progress. Among the pioneers, then, his name will stand high, but among the smaller folk, the men who have worked with him in the Air Force and the Air Ministry—and after six years with him I would dare to include my name among them—he will be remembered not only for his original mind, his broad view, and his strong character, but also for the very human qualities that endeared him to all of us. That he may now enjoy many years of active and agreeable retirement, and that Sir John Salmond may prove as successful as his predecessor is the confident wish of all who admire the Air Force and desire the progress of British aviation.

Your obedient servant,

SAMUEL HOARE.

18, Cadogan Gardens, S.W.3, Dec. 31.

THE ROYAL AERONAUTICAL SOCIETY.

The opening lecture of the second half of 1929-30 Session will be given on Jan. 9, 1930, at 18.30 hours in the Lecture Hall at 18, John Street, W.C.2.

The lecture will be on "The New American Wind Tunnels," by Mr. R. McKinnon Wood, who will show why the compressed air tunnel, the full scale tunnel, and the full speed tunnel are necessary for the future development of aeronautics.

The lecture programme for this half of the Session is as follows:—

Jan. 23.—Mr. H. B. Howard on Certificates of Airworthiness.

Feb. 6.—Mr. J. W. Maccoll, on Modern Aerodynamical Research in Germany.

Feb. 13.—Senor de la Cierva will give his previously postponed lecture on Recent Work on the Autogiro.

Feb. 19 (Wednesday).—Dr. Georgii on Gliding. This lecture will be at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, W.C.2.

Feb. 27 (at 19.45 hrs.).—Mr. A. J. Rowledge on the Latest Developments of Aero Engines. (Joint lecture with the Institution of Automobile Engineers. Refreshments will be served in the Library.)

Mar. 6.—Major F. M. Green and Mr. H. C. H. Townend on the Resistance of Air-cooled Engines and the Townend Ring.

Mar. 10 (at 17.30 hrs.).—Herr Martin Wronsky, Managing Director of Luft Hansa, on Air Transport. (Joint lecture with the Institute of Transport at the Institution of Electrical Engineers).

April 3.—M. P. Grimault on the Operation of the Aero-Postale service in Europe.

The attention of members of the Royal Aeronautical Society is drawn to the new hours of opening the Library which come into force in 1930.

On and after Saturday, Jan. 4, the Library will be open on Saturday afternoons from 14.30 to 17.30 hrs. to members. It will be closed on alternate Wednesday afternoons.

The complete times of the opening of the Library are as follows:—Monday—Friday, 09.30 hrs. to 17 hrs. except alternate Saturday, 09.30 hrs. to 12.30 hrs. and 14.30 hrs. to 17.30 hrs.

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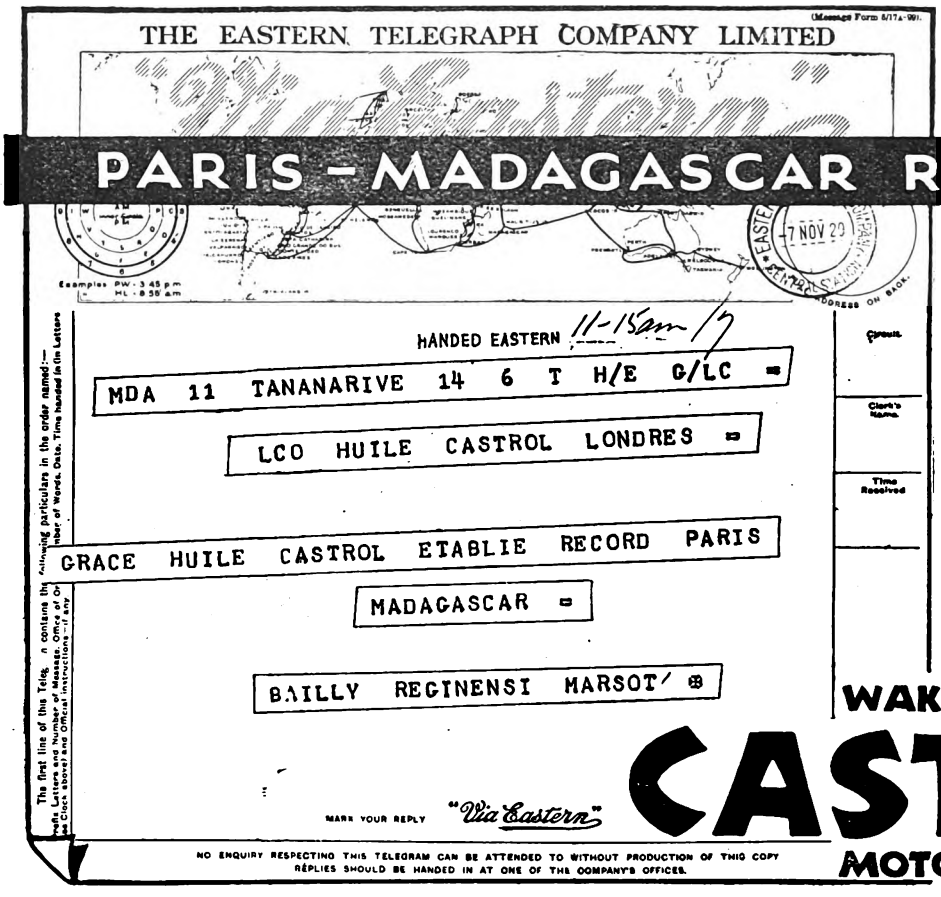

Messrs. Bailly, Reginensi and Marsot left Le Bourget on October 30th, reaching Tananarive, a distance of 12,460 kilometres, in 8 days 5 hours, so beating the previous record by 52 Hours.

The Gnome et Rhone "Titan-Jupiter" engine of their Farman Monoplane was lubricated with Wakefield CASTROL—the product of an All-British Firm.

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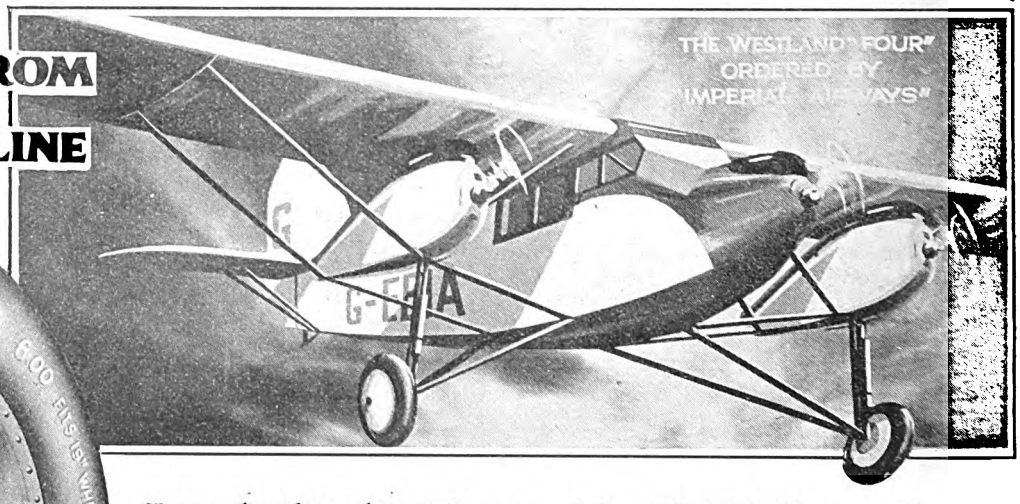

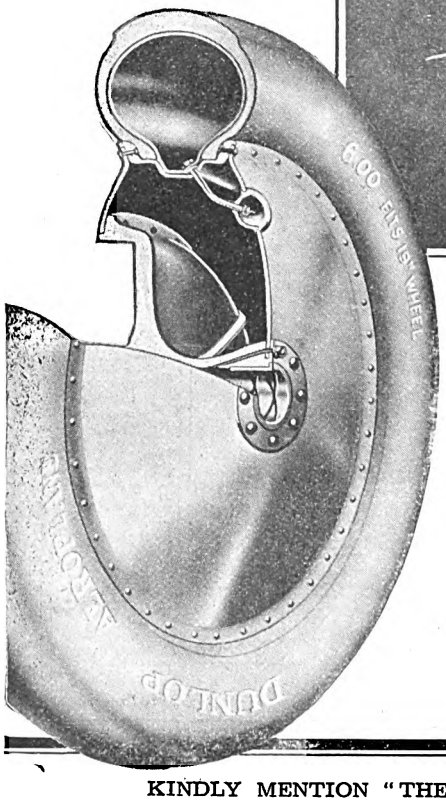

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COMMERCIAL AERONAUTICS.

OBSTACLES TO OVERSEAS TRADE.

One of the leading men in the Aircraft Industry writes as follows concerning official obstacles to Overseas Trade. It touches a very important factor in the situation:—

We all agree that one of the most serious obstacles which we have to get over in launching a civil aircraft is that of obtaining an Airworthiness Certificate, but I am afraid the restrictions of which you complain in your leading article of December 18 cannot be laid at the doors of the Air Ministry, except in so far as that the Air Ministry may have been instrumental in determining the question as to whether or no Great Britain became one of the parties to the Air Convention of Oct. 13, 1919.

You suggest an obvious remedy, namely that the Air Ministry should remove the barrier which at present prevents us from competing on equal terms with America; but the whole of this trouble has its origin in the fact that 26 States, as follows:—Belgium, Gt. Britain and N. Ireland, Canada, Australia, Union of S. Africa, New Zealand, Chile, Denmark, France, Greece, Italy, Japan, Portugal, Roumania, Sarre Territory, Kingdom of the Serbs, Croats and Slovenes, Siam, Irish Free State, India, Bulgaria, Netherlands, Persia, Poland, Sweden, Czechoslovakia, Uruguay, became parties to the Air Convention of Oct. 13, 1919, and hence to the agreed regulations concerning the minimum requirements for Airworthiness Certificates.

On page 6 of the latest copy of the regulations dated May, 1929, you will see the taking-off tests which are laid down as absolute minimums. You will also see that the flight tests concerning the foregoing requirements will be carried out on a horizontal flat ground in calm weather (wind less than 2.5 metres per second measured at a height between 5 and 10 metres above the ground level of the aerodrome).

But there is an important difference between our own requirements and the I.C.A.N. requirements. Whereas the I.C.A.N. requirements lay down, for a machine for public transport, that the machine must clear an obstacle of 20 metres after a run of 600 metres, the corresponding British requirements, laid down in A.P. 1208, are more severe, for the machine has to clear the same height in a horizontal distance of 500 metres.

Thus it may be seen that, to put our aircraft on a par with those of all the I.C.A.N. nations, our machines should be allowed an extra run of 100 metres. And even this may not put our requirements as low as those which satisfy the authorities of the U.S.A.

The object of my letter is merely to point out to you that we aeroplane manufacturers have a very difficult task before us, because if we ask the Air Ministry to relax their requirements they have very carefully to consider the position of this country as one of the parties to the Air Convention.

I find a great many people have not studied the I.C.A.N. regulations. If they have any difficulty in obtaining them they should apply to the Secretary General, *Commission Internationale de Navigation Aérienne*, 20, *Avenue Kléber, Paris*, when they can obtain copies printed in English.

The United States did not sign the Air Convention of Oct. 13, 1919, and hence they are in a different position.

Frankly I do not know how they get over the difficulty when they send their machines to Chile, Uruguay, or Canada, for example (all three of which States have become parties to the Convention) *unless their own regulations are as stringent as or more stringent than the I.C.A.N. regulations.*

INDIAN AIR MAIL EXTENSION.

The Postmaster-General announces that, beginning with the flight due from Croydon on Saturday, December 28, letters can be sent to Jodhpur and Delhi by an air service connecting with the London-Karachi Air Service.

The fee for the combined services is fixed for the present at 7d. per ½ oz., in addition to ordinary postage, and letters for transmission by air beyond Karachi should be clearly superscribed under the air mail label "By Delhi Air Service."

The Postmaster-General understands that the use of the Delhi air service will ensure the arrival of letters at Delhi on Sunday evenings, as compared with Monday mornings, by the ordinary route from Karachi; and that an acceleration of 24 hours will be gained by letters for Bombay, Southern India, and Ceylon. The normal fee of 5d. per ½ oz., in addition to ordinary postage, will be maintained for letters carried by air to Karachi and then on by ordinary route.

Inquiries from Imperial Airways Ltd. indicate that the firm knows nothing more than what is said in this circular.

THE NEXT PARIS AERO SHOW.

The *Chambre Syndicale des Industries de l'Aeronautique* announce that the 12th International Aero Exhibition will be held in Paris from Nov. 28 to Dec. 14, 1930.

We must all hope to see a goodly British entry so that visitors to Paris from all nations may see for themselves the excellence of British aircraft construction. At the last Paris Show foreign visitors admitted that British steel construction and Bristol and Armstrong Siddeley engines were the finest work in the show.

MR. VAN LEAR BLACK'S RETURN.

Mr. Van Lear Black is to make another attempt to fly from Croydon to Tokyo. His last effort ended at Calcutta on June 10, 1929, when his Fokker F-VII 3-m was damaged in taxi-ing over a soft part of the aerodrome.

Mr. Black arrived at Southampton from New York on Dec. 27.

THE FAIREY AVIATION COMPANY.

The First Ordinary General Meeting of the shareholders of the Fairey Aviation Company Limited was held on Dec. 20 at Winchester House, E.C.

Mr. C. R. Fairey, M.B.E., F.R.Ae.S., the chairman and managing director, said:—

Before I proceed with the business of the meeting I feel constrained to refer to the tragedy that has befallen the Royal Air Force attempt to beat the Long Range Record on one of our machines and which has so unfortunately resulted in the death of the gallant pilots, Sq. Ldr. Jones-Williams and Flt. Lt. Jenkins. The organisation for the flight carried out by the Air Ministry was as perfect as it could be, both the time and course chosen were the best possible, and the flight started under really ideal conditions, but apparently in the brief interval between sunset and moonrise, and blinded by a storm, the machine crashed into the extreme end of the Atlas Mountains. Only the direst ill-fortune could have brought about this terrible result as the pilots were then apparently within a few miles of low ground and within a few minutes of safety. I would like on behalf of the company to express to the relatives and to the Royal Air Force our sincere condolences on their terrible loss.

THE CHAIRMAN, in moving the adoption of the report and accounts, said:—The directors are pleased to report the result of the year's working, which, over the period Oct. 1, 1928, to Sept. 30, 1929, shows a profit of £164,953 11s. 1d., thereby easily fulfilling the estimate made in the prospectus.

The trading profit is for the full year from Oct. 1, 1928, but as the company was not incorporated until March, 1929, it has been considered necessary to make a capital reserve of £56,624 10s. 8d., representing the profit earned for the first five months of the full year, and it is recommended that this sum be used to make the writings off shown on the directors' report.

Our turnover his increased and we have been able to make considerable reductions in the prices of our machines over this period, but by the strictest economy in working we have been able to obtain the satisfactory results shown by the accounts.

We have, in the first case, removed altogether from the balance-sheet such useless asset items as preliminary expenses and Debenture discount, a total of £32,049 7s.

The various assets have been depreciated according to their type, and there remains only the question as to how we should deal with the designs asset, which is, of course, our principal one, and the foundation of our business.

On the one hand, it is obvious that designs become obsolete, some quickly and some less rapidly, and for that reason some provision must be made. On the other hand, as the result of our further design work we hope to replace types from time to time, and we have now some new machines undergoing tests which we are hopeful will be productive of orders in the future. If any one of these types goes into production it will result in small or large orders, in which case a heavy write-down of this item would not be essential.

We consider, therefore, that the best way to deal with this matter is to create a reserve against this item, which we propose to start in the current year at the figure of £40,000, so that if prudence so dictates we shall have funds available to write down this asset, or if, on the other hand, the prospects warrant it at some future date, some portion of this fund would be available for return to the general reserve.

We do not in this current financial year encounter the necessity of making provision for a Debenture sinking fund, but this item has to be met in next year's accounts.

After making these various provisions, and also provision of £33,000 for income-tax, as shown, we propose a dividend at the rate of 7 per cent. less tax, on the Ordinary shares, and to carry the balance forward.

The directors have always in view the fact that, in spite of our excellent standing with the Air Ministry, and the fact that they must for a long time be our principal source of business, every possibility must be examined for expanding our markets in other directions.

One experiment of this kind we have made recently in the acquisition of the control of the Air Survey Company Ltd., as this is one of the civil activities of aviation which appear to us to have interesting possibilities. So far its activities have been mostly confined to India, but it is also at the present time engaged on a contract in the Sudan.

This company had made losses prior to our taking it over, but it does possess a quite reasonable number of orders in hand, and having suitable *personnel* and some six years' experience of this class of work, we intend to examine its possibilities and endeavour to put it on a profit-making basis.

The purchase of the aerodrome has been completed and the buildings are approaching completion. Contractors are at work preparing the new aerodrome, which we had hoped to have in service this winter. Owing to the exceptionally heavy weather it is improbable, however, that this aerodrome will be in operation before the early spring. It is a good property, and a large portion of the expenditure has gone in real estate.

In conclusion I have to say that the directors consider the present position a satisfactory one. The works are on full time with good orders in hand and in prospect, and with our resources, both technical and manufacturing, which we believe to be of great value, we see no reason why we should not continue to receive our quota of orders in the future as in the past, and be ready to meet competition and deal with new developments in the aircraft industry as time goes on.

SQ. LDR. M. E. A. WRIGHT, A.F.C., seconded the motion, and the report and accounts were adopted.

The dividend recommended by the board was approved, and the auditors, Messrs. Peat, Marwick, Mitchell and Co., were reappointed.

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THE RIGHT SPIRIT.

The following letter has been received by Air Vice-Marshal Sir Sefton Brancker, K.C.B., A.F.C., Master of the Guild of Air Pilots and Navigators, from Mr. Alexander Duckham, of Alexander Duckham & Co. Ltd.:—

The Guild of Pilots will, I presume, largely adopt the rites of the older Guilds and I wonder whether I might be allowed the privilege of presenting a Loving Cup as an early contribution to the plate of a body of men for whom, as you know, I have a great regard and to whom I wish all that is good.

MR. CHICHESTER'S MISADVENTURE.

An unfortunate omission or misunderstanding was responsible for Mr. Chichester's landing in the salt marshes outside Tripoli on Dec. 21 at 20.10 hours.

Mr. Chichester had made arrangements for the airport of Mellana outside Tripoli to be flood lighted in anticipation of his arrival, but for some reason this was not done. As Mr. Chichester could therefore not find the aerodrome, he attempted to land along the shore.

This he succeeded in doing, but before his machine had come to rest the airscrew hit a sand-dune and was damaged. A new airscrew was cabled for and was despatched by the De Havilland Aircraft Company on Chistmas Eve.

The only stops which have been made so far are Lyon, Catania (Sicily), and Tunis.

SEVILLE—PERNAMBUCO.

At 12.30 hrs. on Dec. 15 Capt. Challe, of the French Army, and Col. Larre Borges, of the Uruguayan Army, left the Tablada Aerodrome, Seville, in a Breguet XIX long-range biplane (450 h.p. Lorraine Dietrich engine) in an attempt to fly to South America.

At 14.50 hrs. they were signalled at Rabat, at 15.23 hrs. at Casablanca, and at 17.50 hrs. at Rio de Oro.

At 06.30 hrs. on Dec. 16 they passed over the Cape Verde Islands and at 11.36 hrs. they were seen by the steamer *Belfort* 800 kms. to the south of Cape Verde.

At 15.35 hrs. a wireless message from the machine gave their position as 200 kms. W. of St. Paul's Rock and 1,200 kms. from Natal, Brazil.

At 21.30 hrs. (local time) the Breguet was seen at Maceio, 175 kms. south of Pernambuco, and between 05.00 and 06.00 hrs. they landed at Maracuja in the state of Rio Grande del Norte about 60 miles from the coast. The machine turned over on landing, and Capt. Challe was slightly injured.

A NEW CLOSED-CIRCUIT RECORD.

On Dec. 15 MM. Costes and Codos took off from Istres aerodrome near Marseilles in the Breguet XIX "?" (600 h.p. Hispano-Suiza engine) in an attempt to beat the World's Record for distance covered in a closed circuit held at the time by Capt. Ferrarin and the late Major del Prete, who, on June 2, 1928, covered a distance of 7,666 kms. (4,760 miles) in a Savoia 64 monoplane (500 h.p. Fiat engine).

The machine took off in 38 seconds with a total loaded weight of 6,200 kgs. (13,640 lbs.), of which 5,200 kgs. (11,400 lbs.) was fuel load. To help the get-off the machine used a detachable tail trolley which dropped off after a run of 800 m. (2,600 ft.) The machine flew over a circuit of 333.6 kms. between Marseilles and Avignon.

At 11.58 hrs. in Dec. 17 the existing record was broken and at 13.24 hrs. the machine landed after having covered 8,016 kms. (4,978 miles) in 52 hrs. 34 mins. The last few hours of the flight were made in a mistral which reached a speed of 108 km.p.h. After landing the machine still had 400 litres (88 gals.) of fuel in the tanks.

THE MOTH IN FRANCE.

As has already been reported in THE AEROPLANE the French Morane-Saulnier Company has acquired the licence to build the D.H. Moth and the D.H. Gipsy engine in France, and the company is preparing to produce a series of 100 during 1930.

The Morane-Saulnier Company is also making arrangements for a number of distributor-agents and service stations to be established throughout France and North Africa. Such stations are projected at Villacoublay, Orly, Le Bourget, Angers, Clermont-Ferrand, Bordeaux, Montpelier, Nimes, Marseille, Lyon, Chalon-sur-Saône, Douai, Strasbourg, Algiers, Oran, Tunis and Casablanca.

THE PEOPLE WHO MATTER.

One of the biggest business men in Leeds, who is not in the Aircraft Industry but is keenly interested in helping air transport, writes:—

"My best personal thanks to you for serving me with such a bright paper every week."

AS OTHERS SEE US.

This is from a keen aviator in the Netherlands East Indies:—

"I like also to express my highest satisfaction with your excellent journal. Every week I am eagerly waiting for THE AEROPLANE, and find it the best of my nine aviation papers from all countries."

THE AIRWAY TO THE EAST.

The following letters concern the Air-Way to the East on which our friends in the Netherlands have done so much valuable pioneering work. They have now been stopped by the Government of India from flying to their East Indian possessions.

Dr. H. J. Knottenbelt, whose speech in the Netherlands Parliament raised the subject, writes thus:—

I have read with much interest your article "International Obstruction" in your issue of Dec. 18, page 1368.

It is not my intention to ask your hospitality for a discussion on the question dealt with in your article, but I beg to inform you that in my speech in parliament I have not said "that the Dutch services are working well while the British services oversea are still defective."

Apparently your quotation is based on a telegram of Reuter's, whose Hague correspondent unintentionally gave a wrong statement of my speech, which at once has caught my attention. It was far from me to make any comparison between the British and the Dutch air services.

If I had done so, your criticism that my statement "is one of those political innuendoes that make certain parliamentary utterances so futile or spiteful" would perhaps not be unfounded, but for that reason I want to emphasise that I did not say anything of the kind.

As I am not acquainted with the practice in your country in matters like this I leave it to your good self to determine in what way a rectification should be inserted in your paper.

Finally I might say that your article wrongly says: "Herr" Knottenbelt. "Herr" is the *German* equivalent of "Mr.," but not *Dutch*. The Dutch word is "de heer," but why not simply Mr. K.?

Trusting that you will be good enough to excuse my rectification, the first of which affects my parliamentary attitude (I always try to keep free from "political innuendoes"!).

I am, dear Sir, yours sincerely, (Signed) H. J. KNOTTENBELT.

Apologies are due to Dr. Knottenbelt from THE AEROPLANE for calling him "Herr,"—which was sheer editorial carelessness. But the comparison between Netherlands success and British failure was a quotation from *Luchtvaart*, which is published in the Netherlands East Indies. This may perhaps excuse the reference to "political innuendoes." Dr. Knottenbelt's charming way of protesting is much appreciated.

The next letter is from our good friend Mr. Stephan of the Fokker Company, who writes:—

I have to pick a little (only a tiny one) quarrel with you.

In your number of Dec. 18 you wrote on page 1368 an article concerning some remarks made by Mr. Knottenbelt in the Dutch Parliament. (By the way, why persist in making all Dutchmen into Germans, which we are not. We have no word "Herr" in Dutch!). And in doing so I believe you were rather unjust towards Mr. Knottenbelt, who—as far as I remember—did not mean to say that the English services were defective in the sense which you attach to the word, but stated simply that the English service did not give the same service as far as regards distance.

But the point to which I wish to draw your attention is that you stated that "a large proportion of this year's flights met with trouble owing to weather conditions and bad landing grounds."

Now, although the expression "a large proportion" is vague and therefore difficult in a discussion, still I believe you will agree with me that it does not cover the facts as set out below:

This year's service was started on Sept. 12 and since then 13 flights have been executed, of which *one* ended in a complete crash owing to flying in a fog near Constantinople, and one other was regarded as terminated when on the last lap crossing from the Malay-Straits to Dutch-East-India (Sumatra) the machine lost its way through bad visibility (tropical rains) and returned to the coast, where it landed near Setul and fouled its undercarriage.

As the repairs would take more time than the sending on of the mail directly, the last course was taken. The machine was afterwards repaired and has done two voyages since.

As for the rest the table which I join is self-explanatory. The scheduled flying time is 12 days, which considering the distance is certainly better than the scheduled flying time of Imperial Airways to Karachi. The actual time taken has only exceeded the schedule in two instances, and for the rest was either to schedule or shorter.

The amount of mail transported was between 350 and 850 lbs. per mail flight, with an average of about 480 lbs. In one case a paying passenger was transported and in one case a non-paying passenger. Now don't you think that a slight rectification of your statement as to the "large proportion of flights that met with trouble" is indicated?

MAILFLIGHTS FROM AMSTERDAM TO BATAVIA.

Machine.	Amsterdam dept.	Batavia arr.	Remarks.
PH-AEZ	12 September	22 September	—
PH-AEO	19 September	—	Landed on last lap at Setul (28 Sept.)
PH-AEN	3 October	15 October	—
PH-AGB	17 October	—	Crashed in fog near Constantinople, nobody hurt.
PH-AEZ	31 October	12 November	—
PH-AGR	14 November	27 November	—
PH-AEN	28 November	10 December	—
PH-AEO	12 December	24 December	—

MAILFLIGHTS FROM BATAVIA TO AMSTERDAM.

Machine.	Batavia dept.	Amsterdam arr.	Remarks.
PH-AEZ	8 October	17 October	—
PH-AEN	22 October	1 November	—
PH-AEO	20 November	3 December	—
PH-AEZ	4 December	13 December	—
PH-AGR	18 December	28 December	—

Mr. Stephan has made good his case.—C. G. G.

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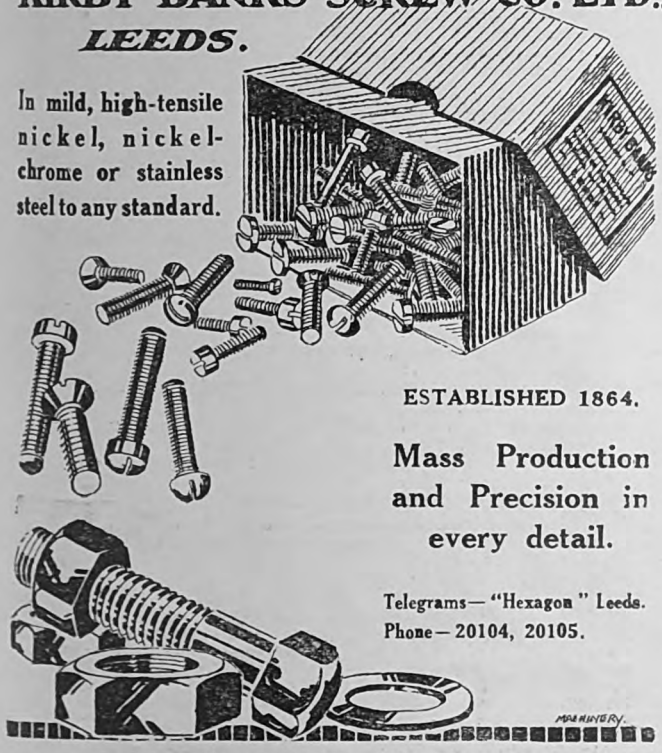

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A TRIBUTE TO AN ENGLISH FIRM.

The following letter in *The Times* of Dec. 30 shows what we here can do when we try:—

Sir,—You may think that the following example of promptitude in manufacturing goods in England and in delivering them overseas deserves to be put on record in your columns, particularly since the article supplied was a somewhat unusual one.

I use a small balloon for taking air photographs of the archæological excavations here. My old one came to an untimely end a few weeks ago; so on November 25 I cabled to the R.F.D. Company, of Guildford, a firm with which I had not previously dealt, asking them to make me a new one to a particular specification, and on the following day I confirmed my cable by a letter in which I asked that the balloon might be sent me by the shortest route.

A balloon is not altogether an easy thing to plan or to put together, but mine was completed and despatched *via* Imperial Airways by December 7, reaching Gaza on the 13th Only four days later—on the 17th—I received it at Haifa, and one must remember that during this interval it had been in two Custom Houses, and that the distance between Gaza and Haifa is quite 120 miles. I might even have hastened the time of delivery by going to Gaza and clearing it at the Custom House there, but I did not do so, and the total number of days which elapsed between the giving of the order and the receipt of the goods thus stands at the very respectable figure of 22.

(Signed) P. L. O. GUY.

The University of Chicago Megiddo Expedition,
Megiddo, Palestine, Dec. 18.

CROYDON NOTES.

Certain people, not unconnected with the R.A.F., when over at Croydon Aerodrome recently, demanded to know "who that darned penny-a-line fellow Spry was." They expressed a desire to reason with him, but unfortunately the opportunity did not occur at that time. Their idea seemed to be that Spry was anti-R.A.F. which is not the case, and that it was unfair because the R.A.F. could not argue back.

Spry is not necessarily anti-anything, but he is definitely pro-commercial aviation, and has been intimately mixed up with it for over a decade. He will always prick up his otherwise drooping ears and bark when he discerns or thinks he discerns any infringement or attempt at infringement upon the perquisites, rights or prerogatives (if any) of Commercial Aviation, and thus he may appear anti-R.A.F. when R.A.F. and commercial interests appear to clash.

A little leg-pulling is obviously good for the R.A.F. anyhow.

Spry has a vast admiration for the R.A.F. at their own proper job and has had his best hat scientifically wafted off his head by formations of Foxes and the like at Hendon too often not to respect those who can so lightly juggle with a seven and sixpenny Dunn. If an Argosy tried to whiffle for Spry's bowler, he would fall flat on his face and scream. One did once, and Spry did, and old man Horse will remember the incident no doubt.

As for the R.A.F. being unable to argue and back answer, Spry feels it as acutely as anyone, but he did not make the ruling.

If those who came to Croydon after Spry's blood, will come again (but peaceful like, mind!) anyone will lead them to his lair, where he will be found lurking behind an outsize in olive branches with a positively bloated dove of peace in its foliage.

If there are any burning points in their bosoms they can unburden them, and Spry will give these questions a fair field in these columns, provided the Editor agrees.

Nobody knows but what the tooth of wisdom might not clank against the tankard of friendship on such occasions, but if on the other hand Botley is, so to speak, in cloud, and gale warnings are issued, the tankards will be replaced by leathern bottles which do not dint the brow when used to punctuate an argument.

The day before Christmas Day, a French Air Union pilot, named M. Nevot, crossed the Channel at something like 195 m.p.h. according to his own reporting, and did the 40 odd miles between Dungeness and Paris Plage in some 13 minutes. The machine was F-AIGB, and the record is not regarded as official, owing to the fact that the pilot probably neglected to report leaving Dungeness until he was nearing the other side.

Yuletide passed off as well as could be expected at the Aerodrome, and on Christmas Eve, several serious commercial gentlemen never known to smile or smoke anything than a gasper, were observed with a broad smile wedged permanently into position by a fat cigar with a jewelled hand.

Several Imperial Airways pilots, having watched the distribution of turkeys and what not, went home and peered into their stockings with an anticipatory "gug." Finding nothing therein, they very wickedly remarked "Pah!" not to say "Blah!"—SPRY.

THE LONDON TERMINAL AERODROME.

FIGURES FOR WEEK ENDING DEC. 21.

Trips per Day.—Sunday, 1; Monday, 9; Tuesday, 20; Wednesday, 17; Thursday, 18; Friday, 16; Saturday, 20.

IMPERIAL AIRWAYS LTD.:
London — Egypt — India: London — Paris — Basle — Zurich: London—Ostend—Brussels—Cologne and return: Machines 38, passengers 219, freight 16¼ tons. India Route: Inward, passengers 0, mail 680 lbs.; outward, passengers 0, mail 949 lbs.

AIR UNION:
Paris—London: Machines 27, passengers 114, freight 15 tons.

K.L.M.:
Amsterdam—Rotterdam—London: Machines 12, passengers 41, freight 5¼ tons.

SABENA:
Brussels—London: Machines 13, passengers 32, freight 3¾ tons.

DEUTSCHE LUFT HANSA A.G.:
Amsterdam—London: Machines 12, passengers 22, freight 4 tons.

MISCELLANEOUS:
British machines 1, passengers 0.
Foreign machines 0, passengers 0.
Total number of trips by British machines, 39, carrying 219 passengers. Foreign machines, 64, carrying 209 passengers.

COMPARATIVE FIGURES.

Week ending Dec. 21:
Machines, 103; Passengers, 428; Crews, 277; Total personnel, 705.
Corresponding week, 1928:
Machines, 52; Passengers, 209; Crews, 104; Total personnel, 313.
Corresponding week, 1927:
Machines, 57; Passengers, 202; Crews, 101; Total personnel, 303.
Corresponding week, 1926:
Machines, 65; Passengers, 145; Crews, 80; Total personnel, 225.
Corresponding week, 1925:
Machines, 23; Passengers, 76; Crews, 27; Total personnel, 103.
Corresponding week, 1924:
Machines, 45; Passengers, 103; Crews, 56; Total personnel, 159.
Corresponding week, 1923:
Machines, 11; Passengers, 17; Crews, 16; Total personnel, 33.
Corresponding week, 1922:
Machines, 41; Passengers, 95; Crews, 81; Total personnel, 176.
Corresponding week, 1921:
Machines, 30; Passengers, 49; Crews, 48; Total personnel, 97.
Corresponding week, 1920:
Machines, 8; Passengers, 10; Crews, 10; Total personnel, 20.

FIGURES FOR WEEK ENDING DEC. 28.

Trips per Day.—Sunday, 5; Monday, 15; Tuesday, 15; Wednesday, 0; Thursday, 7; Friday, 14; Saturday, 17.

IMPERIAL AIRWAYS LTD.:
London — Egypt — India: London — Paris — Basle — Zurich: London—Ostend—Brussels—Cologne and return: Machines 30, passengers 160, freight 11¼ tons. India Route: Inward, passengers 0, mail 1,050 lbs.; outward, passengers 0, mail 732 lbs.

AIR UNION:
Paris—London: Machines 19, passengers 63; freight 8¼ tons.

K.L.M.:
Amsterdam—Rotterdam—London: Machines 6, passengers 14, freight 2¼ tons.

SABENA:
Brussels—London: Machines 9, passengers 18, freight 1¾ tons.

DEUTSCHE LUFT HANSA A.G.:
Amsterdam—London: Machines 9, passengers 10, freight 2 tons.

MISCELLANEOUS:
British machines 0, passengers 0.
Foreign machines 0, passengers 0.
Total number of trips by British machines, 30, carrying 160 passengers. Foreign machines, 43, carrying 105 passengers.

COMPARATIVE FIGURES.

Week ending Dec. 28:
Machines, 73; Passengers, 265; Crews, 197; Total personnel, 462.
Corresponding week, 1928:
Machines, 55; Passengers, 208; Crews, 110; Total personnel, 318.
Corresponding week, 1927:
Machines, 46; Passengers, 190; Crews, 83; Total personnel, 273.
Corresponding week, 1926:
Machines, 43; Passengers, 93; Crews, 78; Total personnel, 171.
Corresponding week, 1925:
Machines, 28; Passengers, 39; Crews, 31; Total personnel, 70.
Corresponding week, 1924:
Machines, 22; Passengers, 49; Crews, 25; Total personnel, 74.
Corresponding week, 1923:
Machines, 35; Passengers, 58; Crews, 57; Total personnel, 115.
Corresponding week, 1922:
Machines, 41; Passengers, 109; Crews, 80; Total personnel, 189.
Corresponding week, 1921:
Machines, 15; Passengers, 36; Crews, 23; Total personnel, 59.
Corresponding week, 1920:
Machines, 21; Passengers, 15; Crews, 25; Total personnel, 40.

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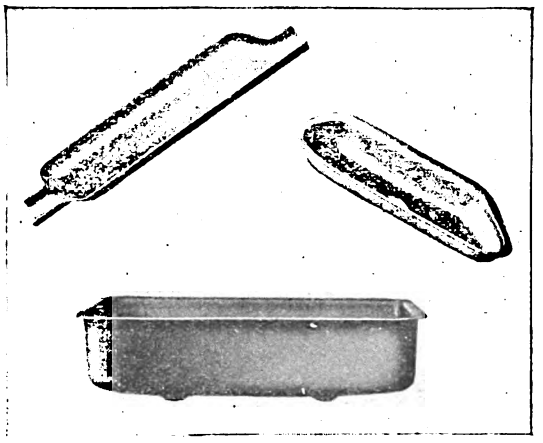

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A CUSTOMS AERODROME AT HESTON.

Heston Air Park has been approved by the Secretary of State for Air as a Customs aerodrome. This means that not only can the Private Owner clear for the Continent and fly there direct without calling at Lympne or elsewhere, but also that machines belonging to the recognised Air Lines can be cleared at Heston.

This latter feature is of special interest for now, if Croydon should be under fog, instead of landing at one of the emergency grounds, with the attendant delay of ground transport, air liners can fly up to Heston and disgorge their cargoes quite close to Town.

Statistics and observation tend to show that even when Croydon is fogbound, Heston is free from such obscurity.

Recent visitors to Heston will have noticed a new building which has been put up between the big hangar and the Club House. This is now in use as a garage. An extension is being added to the aerodrome side of this for Customs accommodation. There will be an office, an examination room and a small transit shed where bonded goods can be stored.

Airwork Ltd. are to be congratulated as the first commercial and unsubsidised Air Park in the country to obtain Customs facilities, thereby keeping Heston in its place as a model Air Park.

WILSON AIRWAYS' ACTIVITIES.

On Nov. 21 1929 Mr. T. Campbell Black, the Managing Director of Wilson Airways Ltd. of Nairobi, flew from Nairobi to Mombasa and back, a distance of 540 miles, in one day in the company's Gipsy Moth *Knight of the Mist*. Mr. Hugo Dunkerley the Editor of *Aeroken* the official journal of the Aero Club of East Africa was the passenger.

The *Knight of the Mist* is the Moth in which Mr. T. Campbell Black flew from Kenya to England and in which Flt. Lt. F. A. Swoffer flew from England to Kenya late in 1929. This machine is now being used for instructional work at Nairobi with Mr. Swoffer as instructor.

During November the Avro Five (three Armstrong-Siddeley Genet-Major engines) *Knight of the Grail* was chartered from Wilson Airways by two business men to fly from Nairobi to Salisbury (Rhodesia). So evidently there are possibilities in that part of Africa when people are a little better educated in air affairs.

LASCO ACTIVITIES.

The Larkin Aircraft Supply Co. Ltd. of Melbourne is completing a three-engined cabin monoplane to be called the Lascondor, which is being specially built for use by the Australian Aerial Services Ltd. on the Port Augusta—Mildura—Cootamundra—Sydney air route. It is to be fitted with three 135 h.p. Armstrong Siddeley Mongoose engines.

This machine has been designed by Mr. W. S. Shackleton, formerly of Beardmore's, who was also responsible for the design of the Lascoter single-engined cabin monoplane which was illustrated in THE AEROPLANE recently.

The company has also imported two 500 h.p. Armstrong Siddeley Jaguar engines which are to be fitted in two of the regular air-line machines, the *Love Bird* and the *Diamond Bird*, both of which are being converted into eight-seater aircraft.

BACK NUMBERS WANTED.

Now that *All the World's Aircraft of* 1929 is on sale perhaps some readers of THE AEROPLANE may be willing to sell their 1928 copies cheap. One or two readers want last year's issues, so this office will be glad to hear of any that are on sale.

PERSONAL NOTICES.

DEATHS.

LAWSON.—On Dec. 30, at Wimbledon, as the result of a motor accident, Flt. Lt. John Francis Lawson, A.F.C., R.A.F.

Flt. Lt. Lawson served with distinction in the R.A.F. during the War 1914-18 and was awarded the Air Force Cross for valuable flying services. He had previously served in the ranks of the R.A.M.C. and was given a commission in the R.F.C. in 1916. After the Armistice he was posted to No. 5 Flying Training School, Chester. From there he went, in 1922, to the R.A.F. Record Office. After a course at the London University he was posted in December, 1924, to Headquarters, 'Iraq, for Meteorological duties. He was posted to Headquarters, Inland Area, for personnel staff duties in April, 1928.

SIMS.—On Dec. 30, at Farnborough, Flt. Lt. Charles John Sims, D.F.C., R.A.F.

Flt. Lt. Sims served in the R.A.F. with distinction during the War 1914-18 and was awarded the Distinguished Flying Cross for gallantry in action. In 1920 he did a course in engineering at the London University and in 1922 he was posted to the Royal Aircraft Establishment for instruction. He attended the London University for a further engineering course in 1922 and then was appointed to the Air Ministry Laboratory at the Imperial College of Science. He was promoted Flight Lieutenant in January, 1926, and in October of that year was posted to the School of Photography, Farnborough, and attached for special duty with the Royal Aircraft Establishment. He had recently been engaged in special research work in 'Iraq.

MARRIAGE.

BUXTON—FISHER.—On Dec. 21, at St. Martin-in-the-Fields, Mr. Geoffrey Mungo Buxton, R.A.F., eldest son of the late Cdr. Bernard Buxton, R.N., and the late Lady Hermione Buxton, and Miss Horatia Mary Fisher, younger daughter of Vice-Admiral Sir William Fisher and Lady Fisher.

FORTHCOMING MARRIAGES.

PARKER—LANGLEY.—The engagement is announced between Mr. Hugh M. G. Parker, R.A.F., second son of Lieut.-Col. G. M. G. Parker, late Indian Army, and Mrs. Parker, and Kitty, only daughter of Mrs. H. Gilchrist Langley, of 46, Waterloo Road, Bedford.

PEARCE—MACLEOD.—The engagement is announced between Nicholas Anthony Pearce, R.A.F., younger son of the late Robert Pearce and Mrs. Pearce, of Ripley Court, Surrey, and Katherine Ann, only daughter of the late James Torquil Magnus Macleod, of Aros Rhu, Dumbartonshire, and Mrs. Macleod, of Vale House, Iwerne Minster, Blandford.

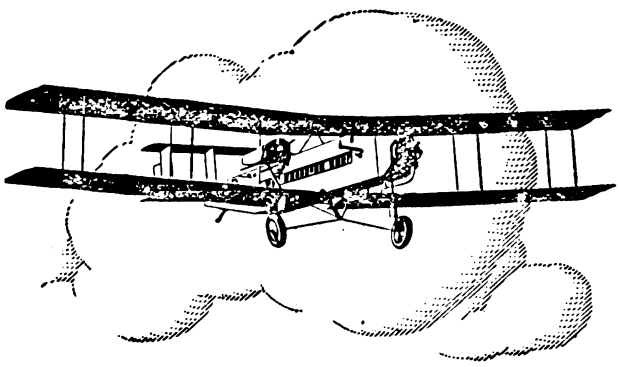
BIRTHS.

BLACKER.—On Dec. 20, at 29, Seymour Street, W.1, to Major and Lady Doris Blacker—a daughter.

EVANS.—On Dec. 20, to Germaine, wife of Wing Cdr. T. H. Evans, R.A.F., at 3, Elms, Stanmore Road, Stanmore, Middlesex—a son.

TAYLOR.—On Dec. 17, at Rose Cottage, Long Sutton, Somerset, to the wife of Flg. Off. F. Barry Taylor, R.A.F.—a daughter.

WILLIAMSON-JONES.—On Dec. 25, at 3, Wilbraham Place, S.W.1, to Helen (*née* MacLellan), wife of Flt. Lt. C. E. Williamson-Jones, D.F.C., R.A.F.—a son.



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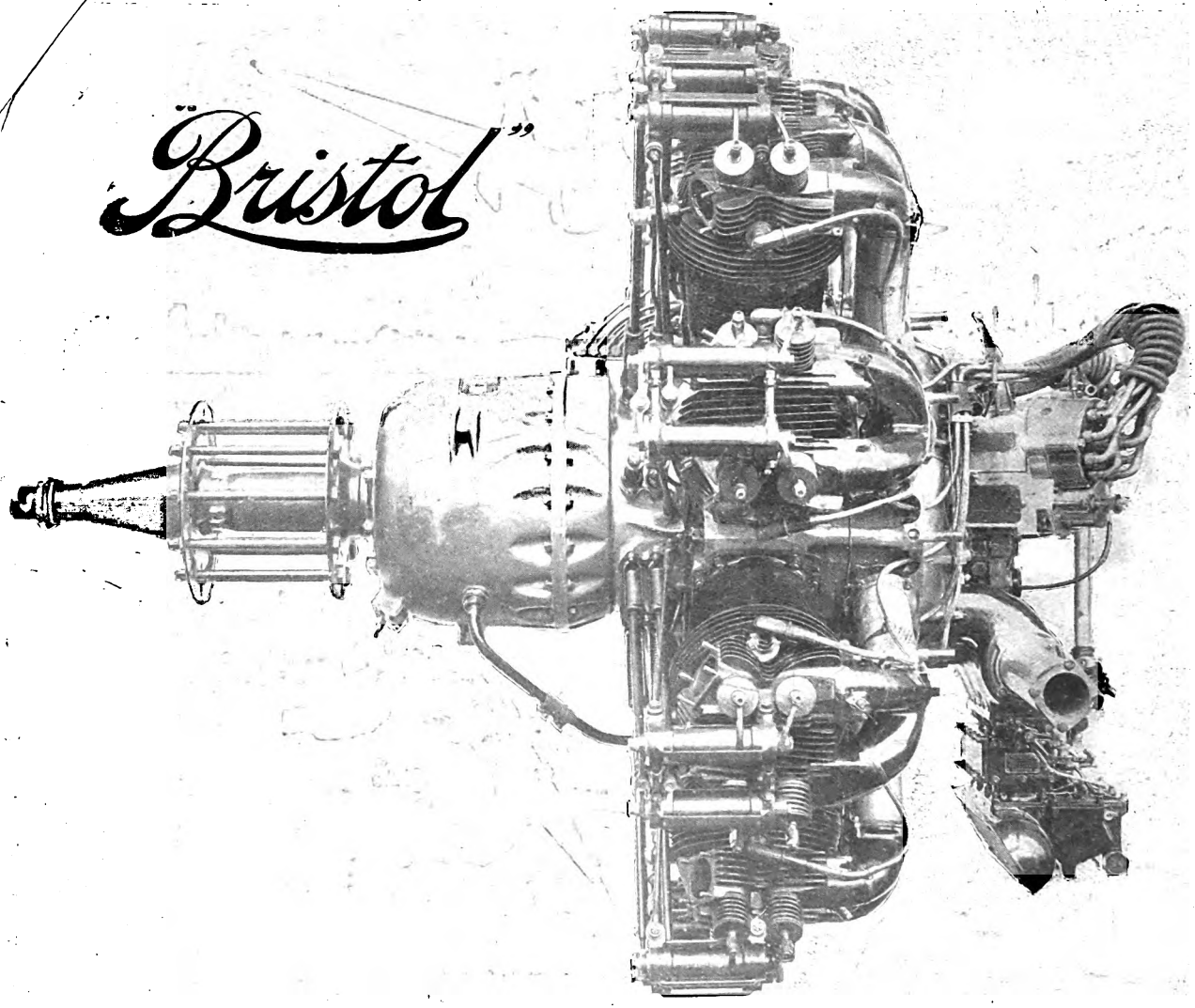

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6d. Weekly.

INCORPORATING AERONAUTICAL ENGINEERING

Edited by C.G.Grey

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JAN. 8, 1930.

THE AEROPLANE

Incorporating

Aeronautical Engineering

VOL. XXXVIII No. 2.

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ON BRITISH PROGRESS IN 1929.—II.

This is the Second Instalment of a review of the general progress of British aircraft and aero-engines in 1929. Last week attention was drawn to the supremacy of British workmanship and material and detail design in aeroplanes, and engines and accessories. Also the 1929 products of those aircraft constructing firms whose names or titles happen in the alphabet between A and H were described in a general way to show the progress they have made.

To-day the products of firms between H and the end of the alphabet are similarly described. And next week the aero-engines of 1929 will be discussed.

The H. G. Hawker Engineering Co. Ltd.

The Hawker Engineering Co. are the direct successors of one of the great pioneer firms of the British Aircraft Industry. That is, or rather was, the Sopwith Aviation Co. Ltd., which was founded before the War 1914-18 by Mr. Tom Sopwith. He and Mr. Fred Sigrist, who was his Works Manager before the War, are now joint Managing Directors of the new firm. And Mr. Camm, the chief designer, is himself a pioneer who worked with Martin and Handasyde in their early days.

The Sopwith Company's contribution to the Royal Flying Corps and the Royal Naval Air Service and the Royal Air Force during the war are so well known that they need no mention here. Of late years a number of squadrons of the R.A.F. have been equipped with the Hawker Horsley torpedo-bomber (650 h.p. Rolls Royce Condor engines). The latest version of this machine is a Horsley with the Armstrong-Siddeley Leopard engine of 700 h.p. So far this has only been used experimentally, but it has a very fine performance. Horsleys have recently been sold to Greece.

The Hawker Company's contribution to British aeronautical progress in 1929 fully entitles them to their place amongst the world's front-rank aircraft constructors.

At the Aero Show at Olympia in July, the Hawker Hornet, a single-seat fighter caused quite a sensation. This machine with the Rolls-Royce F engine disputes with the latest Fairey Firefly the claim to be the World's fastest fighting machine. Unfortunately as it is the property of the Air Ministry no performance-figures are available. But well-informed rumour has it that its speed at ordinary fighting height is well over two hundred miles per hour. Also it is quite one of the handsomest aeroplanes yet produced.

The firm's other outstanding product of 1929 is the Hawker Hart. This is a two-seat fighter, or day bomber, with the Rolls Royce F engine. It, like the Hornet, has an extraordinarily high performance. At ordinary height its speed with full war equipment is 184 miles per hour and at 10,000 feet it still does 172 miles per hour. And it climbs to 10,000 feet with full war load in 8 minutes.

In quite another line the Hawker Company has also turned out a remarkable aeroplane in the past year. This is the Hawker Tomtit.

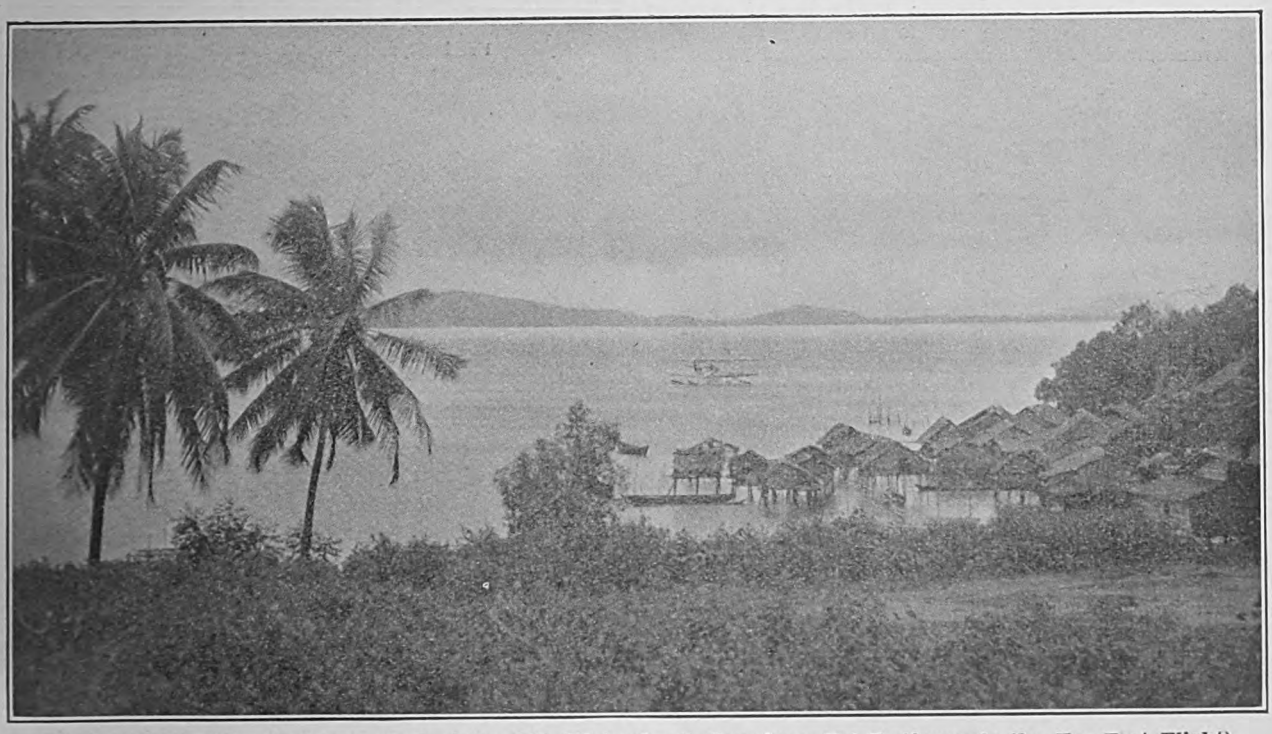
Nominally it is a two-seat training biplane. Its power plant is either the Armstrong Siddeley Mongoose radial of 130 h.p. or the Cirrus-Hermes, four cylinder, in-line of 110 h.p.

With the Mongoose its top speed is 124 m.p.h. Its service ceiling is said to be 30,000 feet.

The Tomtit is of special interest because it has been designed very largely in conjunction with the chief medical authorities of the R.A.F. Everything in it has been arranged so as to make the pilot's work as light as possible. And it has been equipped with a hood over the seat for the pupil so that he can pull the hood over himself and fly blind simply by his instruments. Thus with an instructor in front the pupil can be trained in daylight for night-flying by instruments only.

Apart from this the Tomtit has the making of a singu-

"I TAKE THE WINGS OF THE MORNING AND DWELL IN THE UTTERMOST PARTS OF THE EARTH."—(PSALM CXXXIX. 9.)



SINGAPORE.—The Christmas card of No. 205 (Flying-boat) Squadron, R.A.F. (formerly the Far East Flight), now stationed at Singapore, which is the Headquarters of the new Far East Command. One of the Far East Supermarine Southamptons may be seen at her moorings.

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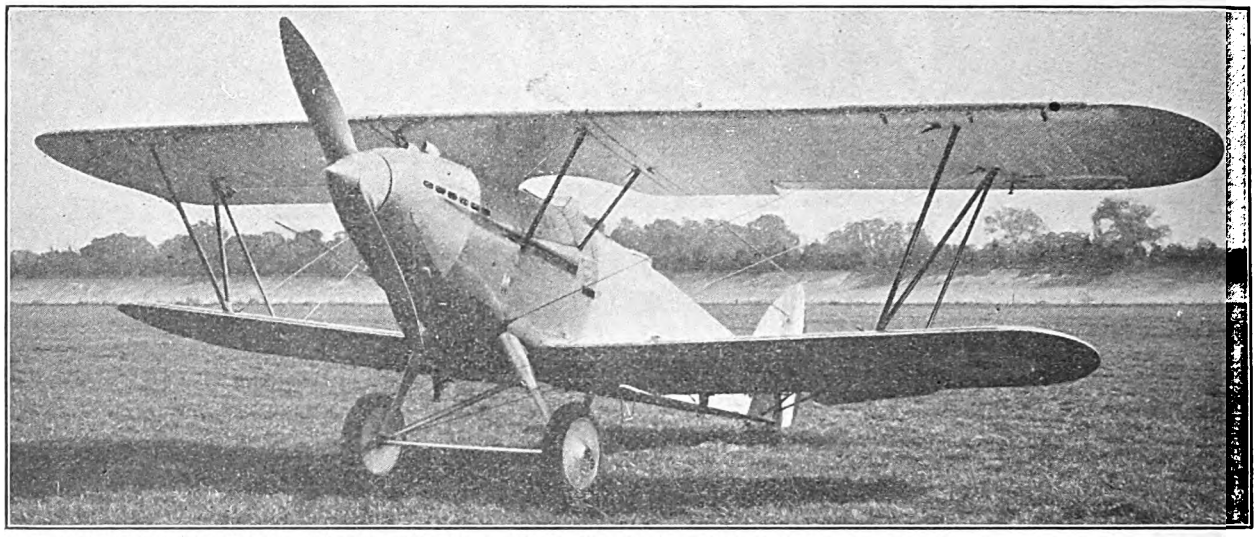


A NEW DAY BOMBER.—The Hawker Hart (Rolls-Royce F), which is built with the Hawker patented system of tubular construction.

larly luxurious light aeroplane for the private owner who can afford a machine which among private aircraft would hold much the same position that a Rolls-Royce does among motor cars.

Apart from the external design of the Hawker aircraft, which gives them such high performance, there is particular interest in noting that the fuselages are built of ordinary steel tubes. The ends are squared and are connected one to another and to the main longerons of the fuselage by angle-plates and ordinary nuts and bolts. The result is that the whole of the machine can be made a mass-production job which can be put together by unskilled labour,—when the demand is big enough.

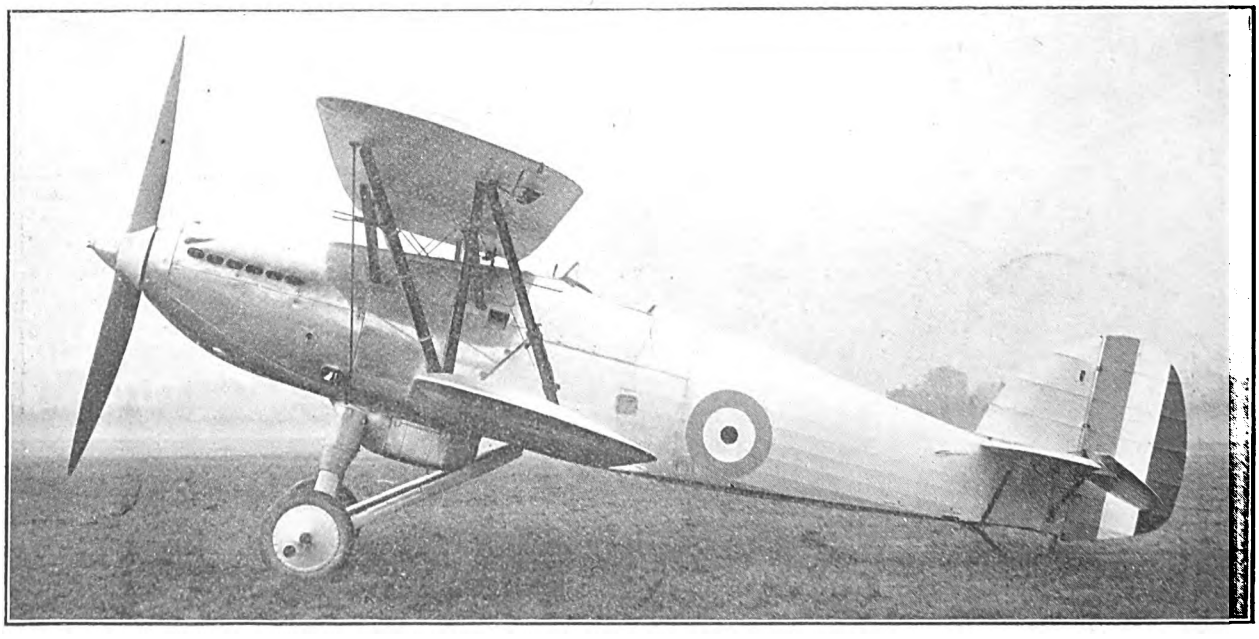
Actually the assembly of all these Hawker machines is as simple as the putting together of a Meccano toy. In fact all the detail designs of Hawker aircraft is devised for extreme simplicity of production. And this simplicity is achieved without in any way adding to the weight of the machines.

Thus we may see that the Hawker Company to-day is doing as good service to the progress of British Aeronautics as did the old Sopwith Company from which it originated.

Handley Page Limited.

The chief contribution of the Handley Page Firm for 1929 has been the further development of the World-famous Handley-Page slots. There has been no radical departure in 1929 from the slots as used in 1928, but the various details of the fittings have been improved and a good deal more knowledge has been gained about the aero-dynamic qualities of the slots in connection with wings of different sections. Consequently the firm is now able to supply to any manufacturer full information about the particular

THE H. G. HAWKER ENGINEERING CO. LTD.—Mr. Fred Sigrist. —(*"Aeroplane" photograph.*)



SPEED.—The Hawker Hornet (Rolls-Royce F) which is claimed to be the fastest single-seat fighter in the World. —(*"Aeroplane" photograph.*)

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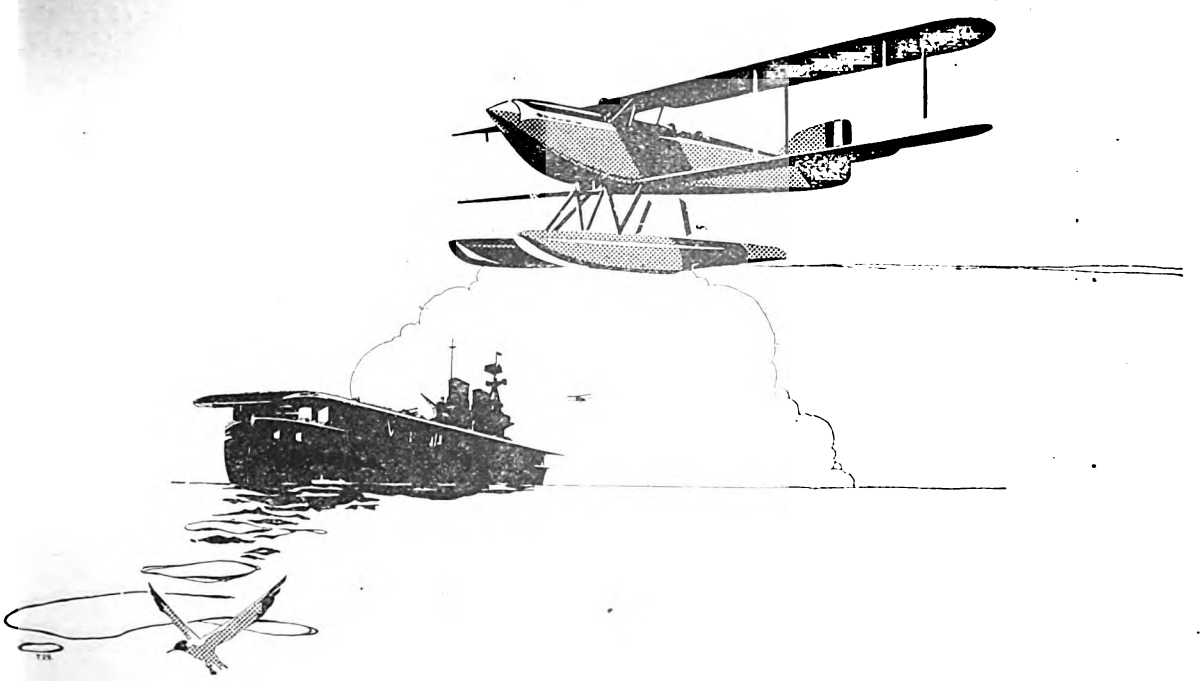

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GEORGE PARNALL AND CO. LTD.—Mr. George Parnall and the Hermes-Elf light aeroplane.
—("Aeroplane" photograph.)

form of slot, and the particular arrangement of it, which is best suited to that particular firm's own wings.

During the year the firm built a special aeroplane with an Armstrong Siddeley Mongoose engine of 150 h.p., for the Safe Aircraft Competition organised in the United States to compete for the prize of £20,000 offered by Mr. Harry Guggenheim. This machine was equipped with slots all along the leading edge, which were interconnected with flaps on the trailing edge. To meet the requirements of the competition, the machine was designed to get off the ground in the shortest possible distance, climb as steeply as possible, to descend as steeply as possible, to fly as slowly as possible and also to fly as fast as possible.

A large number of aeroplanes were entered for the competion but when the date for the arrival of the last entry was reached the Handley Page machine was the only one which had appeared. The rules of the competition were relaxed to allow other entries to arrive and certain other rules were also relaxed to allow other competitors to get through the qualifying test. In a very short time it became evident that the only two aeroplanes which had any chance in the competition were the Handley Page machine, commonly known as the Gugnunc and the Curtiss machine, which was called the Tanager. This latter machine is also equipped with slots, which were obviously of the same species as the Handley Page. At the moment there is a law action pending because the Curtiss machine was not licensed by the Handley Page firm to use slots. Therefore, one cannot comment on the position.

On January 2 of this year, the Committee controlling the Guggenheim Competition announced that the Curtiss machine was the winner. This is not the place in which to discuss the pros and cons of the whole question. But there is no doubt that the competition was won by slots, which if they do not legally infringe the Handley Page patent, are definitely of the same nature and do embody precisely the same principles. Therefore, although a British aeroplane has not won the competition, the huge prize offered for it has been won by what is definitely a British principle of design and construction.

In any event the Handley Page slots have contributed much to aeronautical progress in 1929. Practically all two-seat machines of the R.A.F. are now equipped with slots. And practically all our civil aircraft, from the big Armstrong Whitworth Argosies of Imperial Airways Ltd. down to the Moths and Avians of private owners use slots. And further developments can easily be seen by which flying will become safe, thanks to these slots, much in the same way that motoring has become safe thanks to the production of four-wheel brakes.

The aircraft built by Handley Page during 1929 have mostly been of types which already existed in 1928, and the forty-seat air-liner, the hull of which was shown at Olympia in July last, is not likely to be ready till late in 1930. The Hare, a day-bomber (Bristol Jupiter), with slots all along the upper plane, is still being tested.

George Parnall & Co.

Mr. George Parnall who, apart from his aeronautical work, is one of the biggest shop-fitters in the British Empire, has ever since the end of the War 1914-18 devoted much of his time and fortune to the building of various types of aircraft. His firm's contribution in 1929 has been the Parnall Elf. This is a very neat little light biplane with the Cirrus-Hermes engine. It has a top speed of 108 m.p.h. and a landing speed of 45 m.p.h. It is still more or less in the experimental stage and has not been sold in any quantities, but it is quite interesting. The war machines built by Mr. Parnall's works are of types which already existed in 1928.

Saunders-Roe Ltd.

This firm, which came into existence in 1929, is in fact a combination of two of the great pioneers of British Aviation. Sir Alliott Roe, who was knighted during 1929, is better known to the world as A. V. Roe, who was the first Englishman to fly an English-built aeroplane in this country. And from his early experiments developed the famous Avro firm, whose machines are known all over the world.

Mr. S. E. Saunders was famous as a builder of high-speed motor-boats long before there was any flying. When flying began he built the hulls of our very earliest flying boats, and thus may be reckoned a pioneer of aviation.

When the original Avro firm was taken over by Mr. J. D. Siddeley, Mr. A. V. Roe and his co-director, Mr. John Lord, left A. V. Roe & Co. Ltd., and shortly afterwards joined with Mr. Saunders and formed Saunders-Roe Ltd. In a surprisingly short time the firm produced one of the

SLOTS FOR FRANCE.—A Potez XXV biplane (Lorraine-Dietrich engine) with Handley Page automatic slots of the plaster type. *("Aeroplane" photograph.)*

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PRACTICAL RELIABILITY

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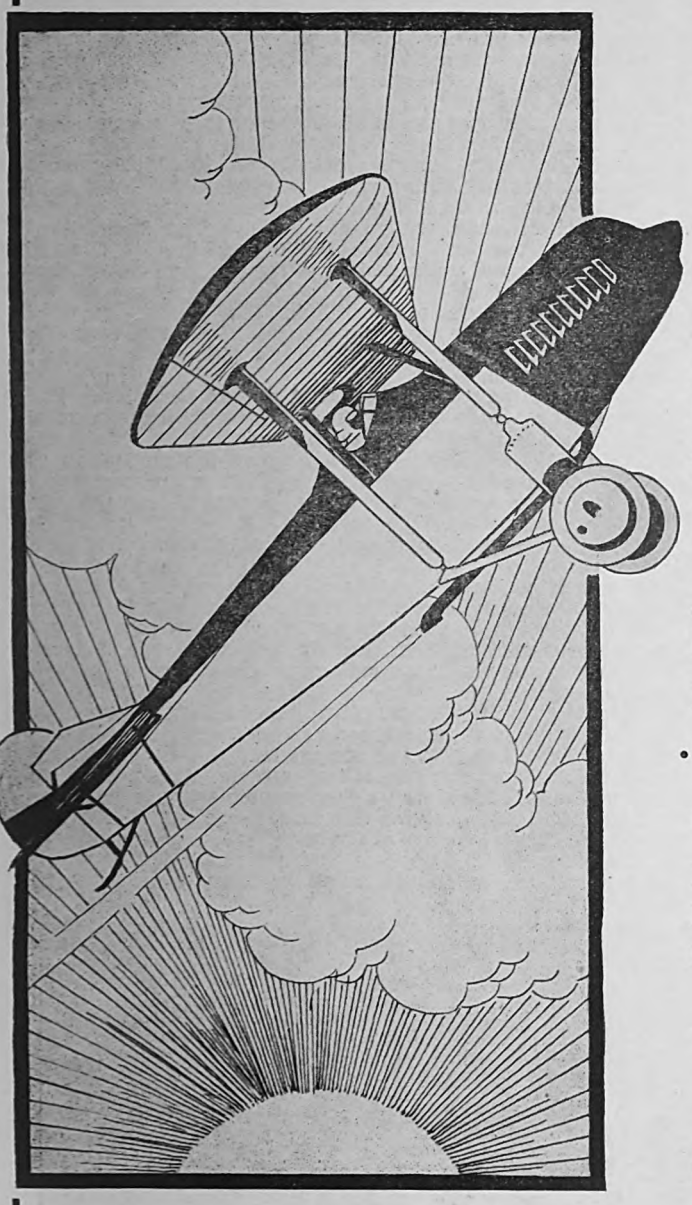

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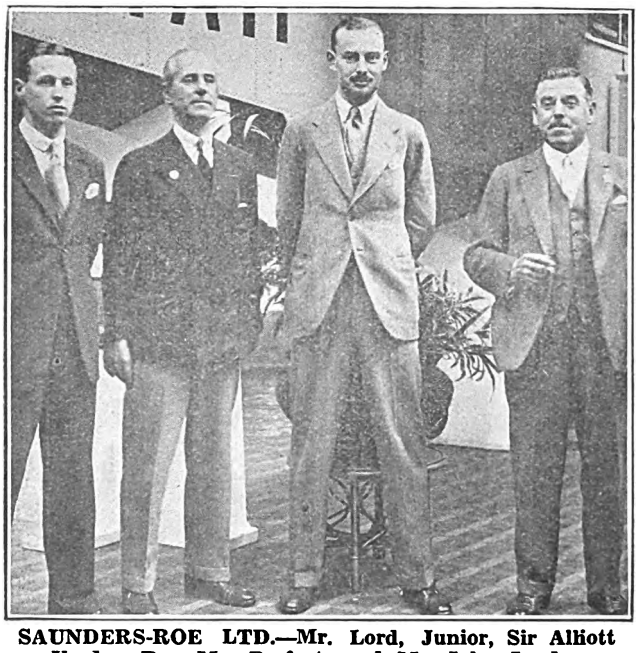

SAUNDERS-ROE LTD.—Mr. Lord, Junior, Sir Alliott Verdon Roe, Mr. Perfect, and Mr. John Lord.
—(" *Aeroplane* " *photograph.*)

most interesting aircraft which has been built in this country.

This is a small flying-boat known as the Cutty Sark. It has a braced monoplane wing mounted on top of a very neat hull with wing-floats on each inside. Above the wings, mounted on trestles are two Cirrus-Hermes engines, side by side. The hull has comfortable cabin accommodation for four people.

The speed of the machine is about 105 m.p.h. and it cruises comfortably at 85 m.p.h. It is in fact the first attempt in this country to build a flying-boat of small size such as might reasonably be bought by a comparatively well-to-do man as a small flying yacht. Altogether it is a very creditable effort for a partnership which has existed such a short time.

The other machines built or being built by the Saunders-Roe firm include a big three-engined flying-boat with Bristol Jupiter engines, which is not yet finished, and a single-seat interceptor fighter biplane, with a Rolls-Royce F engine, which is still being tested by the R.A.F., and so the performance-figures cannot be given.

Short Bros. Ltd.

Here we have yet another of the great pioneer firms. Mr. Oswald Short, the head of the firm, was with his brother the late Horace Short the pioneer of British seaplanes, a species of aircraft in which this country excels all others. From ordinary twin-float seaplanes, the firm has of late years progressed to the building of flying-boats of the largest size. And the outstanding feature of their products has been their seaworthiness.

In a Short Singapore in 1928, Sir Alan and Lady Cobham made a voyage of discovery and survey completely round Africa. And at no time did they have any serious trouble with the machine. After the production of the original Singapore type, which had two Rolls Royce Condor engines, the firm produced the Calcutta, a commercial flying-boat with three 525 h.p. Bristol Jupiter engines.

The first of these put up an extraordinarily good performance and soon afterwards three of the type were ordered by Imperial Airways for use on the stretch of the India-England air line, which crossed the Mediterranean from Genoa by way of Athens to Alexandria. These machines were turned out early in 1929 and for many months they did excellent service, and covered the route with great regularity in all kinds of weather.

Unfortunately two months ago one of them was wrecked in a gale not far from Naples, and the other two were damaged in quite simple accidents on the North Coast of Africa. One ran onto a rock, and the other collided with a boat,—both while still on the water. Consequently the trans-Mediterranean service has had to be suspended of late, but through no fault of the machines themselves which had already demonstrated their extraordinary seaworthy qualities.

Apart from their sea-worthiness the Short Calcuttas have a very fine flying performance. Their top speed is approximately 120 m.p.h. and their cruising speed is just over a 100 m.p.h.

There is interest in noting that one of these boats has been bought by the French Government for experimental work on a Mediterranean seaplane line.

During 1929 the firm has been busy on the production of a three-engined monoplane seaplane. It is an interesting experiment to see whether a big powerful seaplane on floats has any advantage over the flying-boat type which has been so successfully produced by a number of British firms.

The contribution of Short Bros. to the progress of British Aviation extends very much further than building their own flying-boats and seaplanes. They have in fact become providers-in-chief of floats for all and every type of land-going aeroplane which its makers or owners wish to turn into a seaplane.

Consequently, the Short firm have designed and built floats, for such diverse types as the De Havilland Moth and the Avro Avian at the one extreme and the De Havilland Giant Moth at the other extreme. Also they have designed and built a very clever amphibian under-carriage for the Moth which allows the machine to get off from or alight on either land or water.

Altogether the Short firm under Mr. Oswald Short is continuing to contribute most valuable work towards

SHORT BROS. (ROCHESTER AND BEDFORD) LTD.—Capt. A. Mayer, Mr. J. H. Wood, Mr. Oswald Short and Mr. A. Gouge.—(" *Aeroplane* " *photograph.*)

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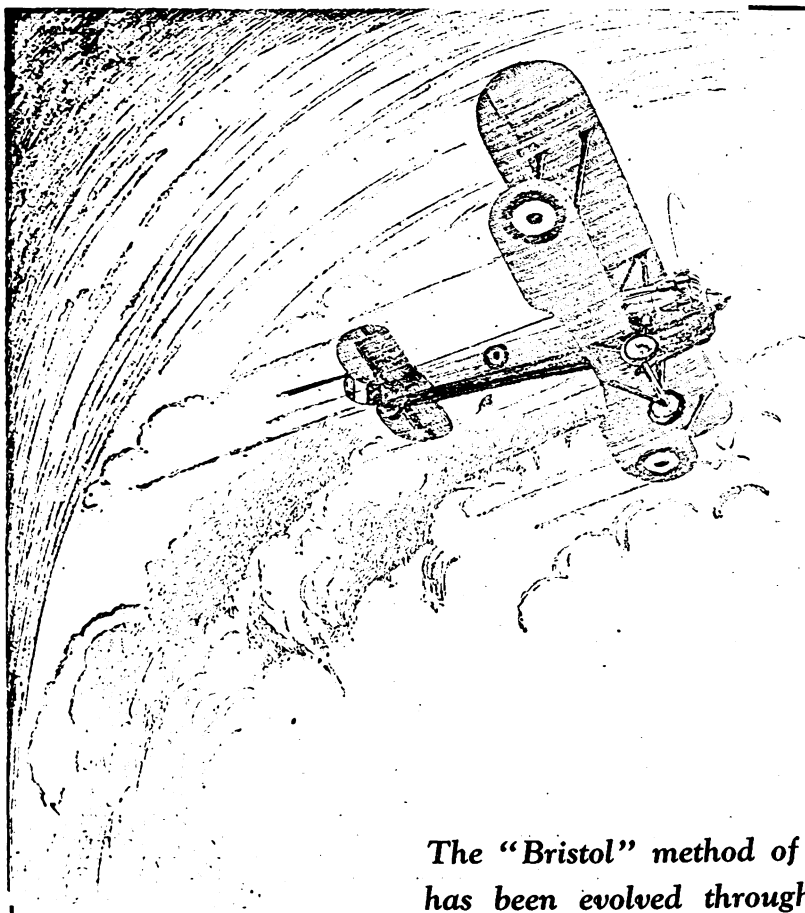

"Bristol"

The "Bristol" method of Steel aircraft construction has been evolved through years of patient research and experimental work, until to-day it represents the most efficient and most durable method of steel construction. Nothing but the finest quality high tensile steel is used in the structural portions of "Bristol" aircraft, and the special design and arrangement of the air frame members make the duties of maintenance and repair at once easily and quickly accomplished. Information upon the general upkeep and execution of field repairs is always available at the "Bristol" Company's works. In this connection special tools have been designed and manufactured which make it quite possible for semi-skilled labour to be used to execute repairs to aircraft, that might well in many cases prove an expensive and prolonged job.

THE BRISTOL AEROPLANE CO. LTD.,

FILTON — BRISTOL.

Telegrams:—Aviation, Bristol. *Flying School.—Filton Aerodrome.* *Telephone:—3906 Bristol*

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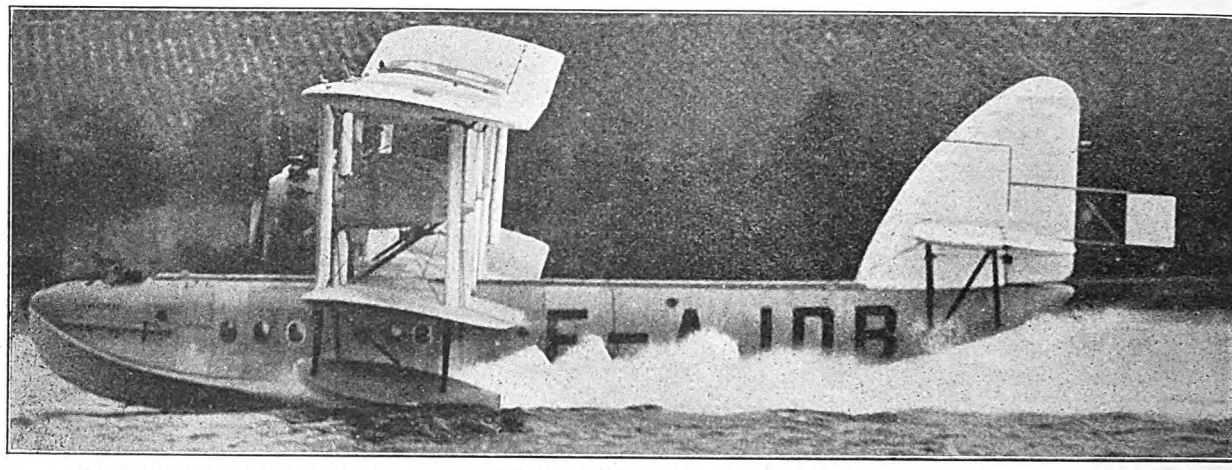

BUSINESS ABROAD.—A Short Calcutta (three Bristol Jupiters) bought by the French Government.
—(*"Aeroplane" photograph.*)

British Aviation to-day, just as it did in the very earliest days.

Simmonds Aircraft Limited.

This firm is of particular interest because its aeroplanes embody a principle which is entirely new. In all other aircraft each wing, whether the four wings of a biplane or the two wings of a monoplane, is different from each of the others. In the Simmonds design each wing is of precisely the same design and construction. The result is that if one wing is damaged it can be replaced by any wing which is in stock,—that is to say the same wing can be used for left-hand bottom or top, or right-hand bottom or top. In the same way, the right-hand or left-hand ailerons are interchangeable. And the rudder is interchangeable with either the right or left-hand elevator.

The firm actually came into being in 1928 but in the early days of 1929 it achieved such rapid success that its orders were too large for the amount of capital available. Consequently the works were compelled to suspend delivery of orders until such time as fresh capital could be introduced to enable the firm to organise its output on a scale commensurate with its orders. In these days when we hear so many complaints of bad trade this is an unusual state of affairs for a British Manufacturer.

The over-trading consequent on an attempt to produce more than the works could manage very nearly produced financial disaster, but happily this danger has been overcome and the firm can now go ahead with what is really a very valuable contribution to aeronautics in general.

Actually, the Simmonds Company is now largely the property of the great financial group the head of which is Lord Cowdray. Mr. O. E. Simmonds, who is the patentee of the interchangeable wing remains as the firm's chief designer and engineer and we may consequently expect new and progressive ideas from him. Lt. Col. Louis Strange, D.S.O., M.C., and Mr. W. D. L. Roberts, M.I.E.E., late of the Egyptian Civil Service, are the other Directors.

Southern Aircraft Ltd.

Here is another new and small firm which shows great promise and has done useful progressive work in 1929. Mr. F. G. Miles, the Managing Director, established himself in small works at Shoreham several years ago and learned to fly whilst running a joy-ride concern and reconditioning joy-ride machines. During 1928 he and his partners acquired an old Avro of what was known as the "Baby" type, and rebuilt it so that it was certified as air-worthy by the Air Ministry. From this re-conditioning work they have progressed during 1929 to designing and building a machine of their own which is called the Martlet.

This is a small single-seat biplane with an A.B.C. Hornet engine, the interesting little four-cylinder double-opposed horizontal engine produced a year or so ago by the A.B.C. Company. At various flying clubs in England towards the end of 1929 the Martlet, flown by various different pilots, has appeared and has put up most remarkable shows of aerobatics.

It is certainly one of the most manœuvrable aeroplanes yet built. With the Hornet engine it has a top speed of 112 m.p.h. and cruises easily at 95 m.p.h. Its landing speed is said to be 40 m.p.h., but, having seen it landed by skilful pilots, the speed seems to be even lower than that. Though the firm is in a small way of business, those concerned with it are young and energetic and full of ideas, so we may hope to see still further contributions to aeronautical progress from them.

The Supermarine Aviation Works Ltd.

This firm is the property of Vickers (Aviation) Ltd., which itself is an offshoot of the great Vickers concern. It is itself amongst the pioneer firms, as it was founded long before the War by Mr. Noel Pemberton Billing, afterwards M.P. for Hertford.

When he entered Parliament it passed into the control of Mr. Hubert Scott Paine. He was joined later by Squadron Commander James Bird, R.N. And a few years ago Squadron Commander Bird became the sole Managing Director. During 1929 he handed over his main holdings in the firm to Vickers (Aviation) Ltd.

Of late years the Supermarine aircraft have become World-famous thanks largely to the designing genius of Mr. R. J. Mitchell. One is in doubt whether to say that the fame of the Supermarine firm rests on its big flying-boats known as the Southampton type or on its high-speed machines, which have three times won the coveted Schneider International Seaplane Trophy.

YOUNG ENTERPRISE.—The Southern Martlet (A.B.C.Hornet—four-cylinder horizontal engine) with Mr. F. G. Miles in the pilot's seat. —(*"Aeroplane" photograph.*)

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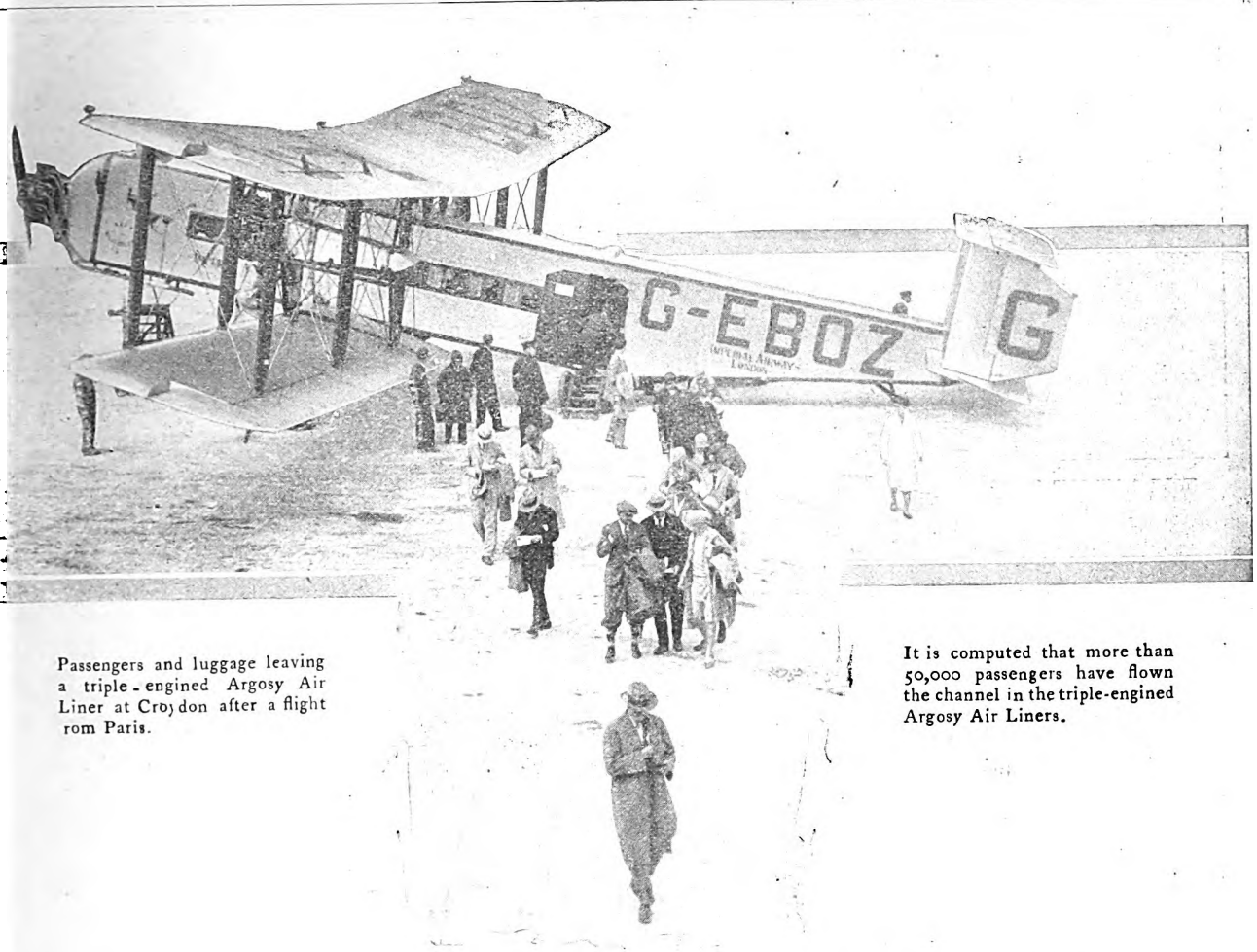

Passengers and luggage leaving a triple-engined Argosy Air Liner at Croydon after a flight from Paris.

It is computed that more than 50,000 passengers have flown the channel in the triple-engined Argosy Air Liners.

During the past four years the public record of the Armstrong Siddeley Engined

ARGOSY

AIR LINERS

has proved them to be the safest, best paying and most easily maintained Air Liners in existence.

The figures given below are totals relating to the operation of all seven Argosies in the European fleet of Messrs. Imperial Airways, Ltd.:

Total miles to 31st October, 1929 - - -	919,320.
Approximate number of Channel Crossings to 31st October. 1929 - - - - -	3,750.
Number of hours flown - - - - - -	10,118.

SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT LIMITED.

Works and Aerodrome: Whitley, nr. Coventry. London: 10, Old Bond Street, W.1.

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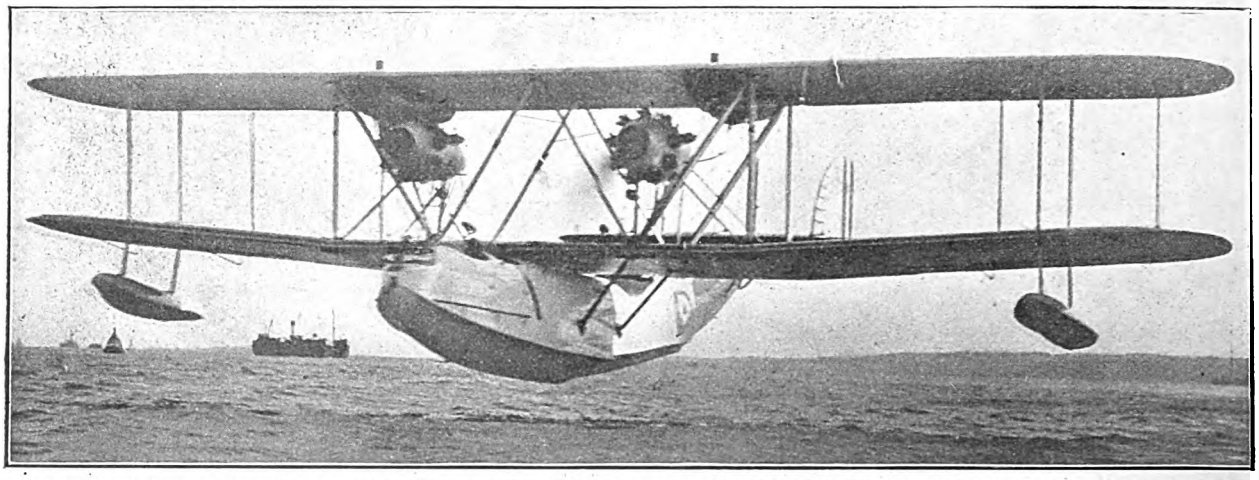


THE LATEST SOUTHAMPTON.—A metal-hulled Southampton with two Bristol Jupiter air-cooled radial engines.

The Southampton flying-boat became World-famous in 1928 because of the great voyage from England to the Far East and all round Australia and back to Singapore which was made by four Southampton boats manned by R.A.F. personnel.

Since then the Southampton has itself been improved in detail and in general, and to-day it may safely be reckoned as among the most seaworthy and airworthy flying-boats in the world.

The hulls of the later types are built of duralumin throughout, but non-corroding steel is now being introduced.

Not only are Southampton flying-boats used largely by the R.A.F. but they have also been supplied to the Argentine Navy and to the Japanese Navy. And a variant of the Southampton, with three Jaguar engines, has been bought by one of the wealthy Guinness family as a yacht.

The Supermarine S-6 Racing Monoplane is certainly one of the greatest achievements in the history of the World's aeronautical engineering. Although designed purely as a competition machine, it is a valuable asset to science, and it has definitely placed British aircraft engineering ahead of that of all other Nations.

Of all World's Records that for absolute speed, independent of all considerations of any kind, certainly is the most coveted, and the Supermarine S-6 with its Rolls-Royce R type engine acquired that record for England in the contest for the Schneider Trophy, which is the sole remaining classic international aircraft competition. In the contest itself the machine put up a speed of 336 miles per hour, piloted by Fl. Off. H. R. D. Waghorn, R.A.F. A few days later the same machine piloted by Sq. Ldr. Orlebar, R.A.F., raised the World's Speed Record, timed over the recognised three kilometre straight course, to a speed of 357.77 miles per hour.

There may be those who question whether sheer breaking of speed-records is of any definite value. To them the answer is that the engine which can produce the power for such speed within the limited capacity available, and the aeroplane which can stand being hurled through the air at such speed and at the same time is thoroughly manœuvrable, do point the way for further developments in aircraft for ordinary use, either for war or peace.

In his interesting article which appeared in the last issue of THE AEROPLANE in 1929, Mr. R. J. Mitchell, designer of the Supermarine S6, set forth clearly the value of racing and record-breaking aeroplanes in the development of aeronautical engineering. Those who have not seen that article should get hold of a copy forthwith for it will enlighten them very considerably.

Outside of the existing Southampton flying-boats and the high-speed racing machines, the Supermarine Company have been building during 1929 a three-engined monoplane flying-boat of a very interesting type. This is now nearly complete and will be flying by the end of March. Therefore, it may be classed as part of the aeronautical progress of 1929.

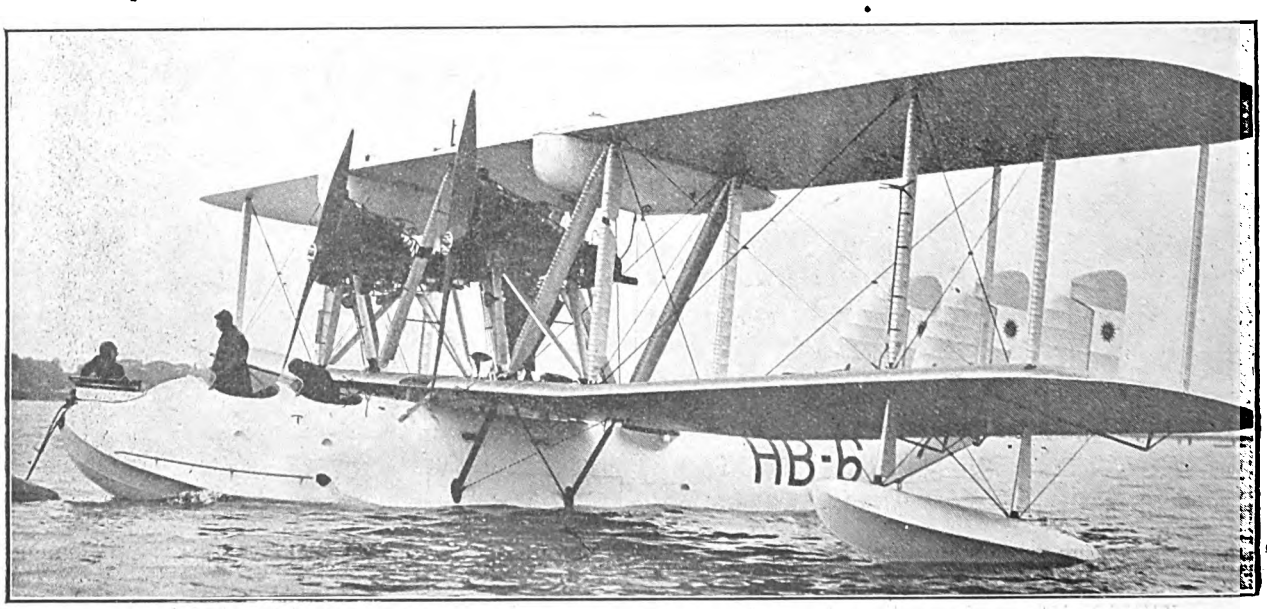
As the Supermarine Company is now the property of Vickers (Aviation) Ltd., Mr. Mitchell is now collaborating with Mr. Rex Pierson, chief designer of Vickers, in the production of various new types of aircraft, both seagoing and landgoing. Several of these are already being constructed, and their design work was done during 1929. Consequently when they appear they will also be chargeable to the progress of 1929.

Unfortunately, one is not free at this moment to describe them, but one can say that when they do appear they will undoubtedly show that our progress during 1929 has far surpassed that of previous years. And nobody will be more startled by such progress than the various Nations who are setting up to be our competitors in the production of transport aircraft.

Surrey Flying Services Ltd.

This firm have for long been doing joy-rides and air-taxi work at Croydon, and they call themselves The Surrey Flying Services because Croydon is in that county. Mr. Grant and Mr. Muir who are the heads of the firm have for many years re-built and re-conditioned their air taxis in their own sheds.

During 1929 they set to work to build a two-seat light



MORE FOREIGN TRADE.—A Supermarine Southampton with metal hull and Lorraine-Dietrich engines, as supplied to the Argentine Navy.

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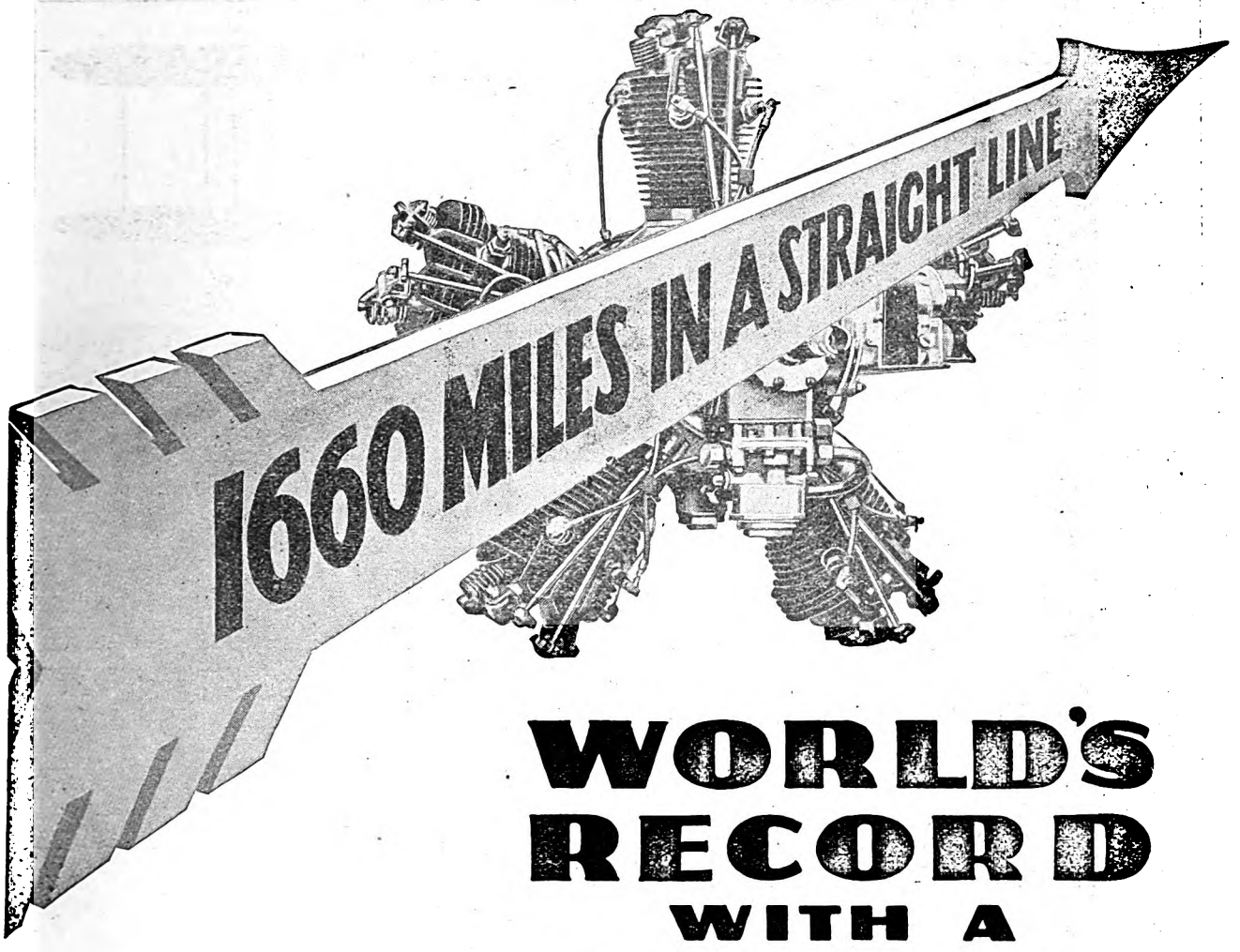

WORLD'S RECORD WITH A GENET ENGINE

2670 km. (1,660 miles) in a straight line by Pilot Zimberly on a Barling N.B.3 fitted with an 80-88 h.p. Armstrong Siddeley Genet, at Brownsville, United States. (Light Aircraft Class 3.)

ARMSTRONG SIDDELEY

MOTORS LIMITED,

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THE SUPREME ACHIEVEMENT.—The Supermarine S.6 (Rolls-Royce R engine and Fairey-Reed airscrew)—the World's fastest vehicle—which has put the speed record up to 357.7 m.p.h.

aeroplane, with a 95 h.p. Salmson engine, which is known as the Surrey AL-1. It is a biplane with an open cockpit which seats two passengers side-by-side. Without being in any way a radical departure from established ideas, it embodies all the long and wide experience of the proprietors of the firm, and as such is a particularly useful little craft.

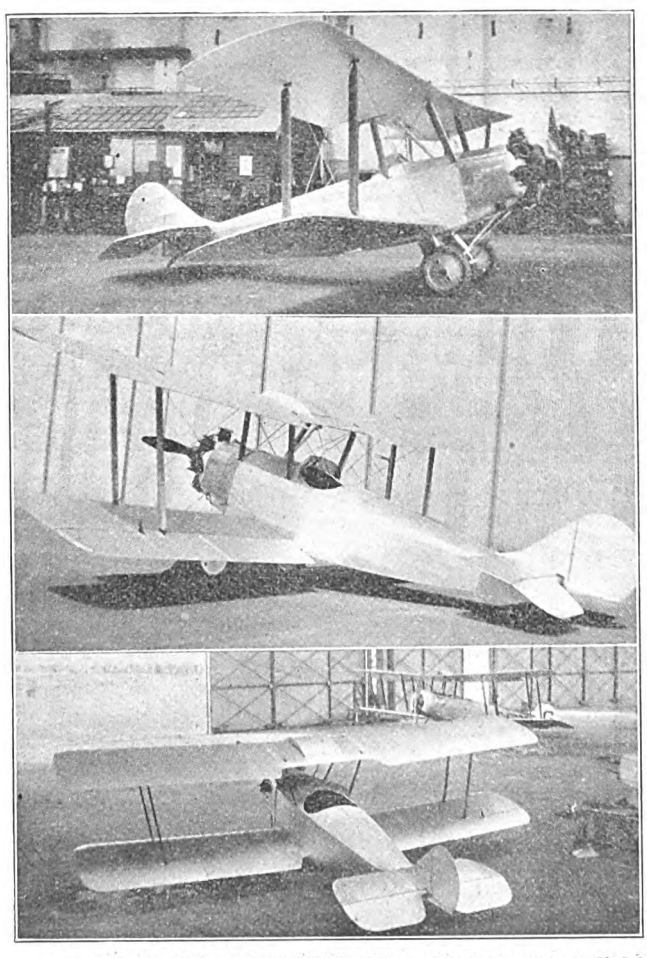
The top speed is 110 m.p.h., which is very good for a side-by-side machine. It cruises at 100 m.p.h. and lands at 45 m.p.h. In this country there are small fields and a lot of fairly high trees, so slow landing is a great advantage. The firm has not laid itself out to build these machines in large quantities, but there should be quite a reasonable demand for it.

Vickers (Aviation) Ltd.

During 1928, the Aviation Department of Vickers Ltd., the famous armament manufacturers, who began building aeroplanes in 1910, was reorganised and registered as a separate limited Company. Sir Robert McLean, who is essentially an organiser of transport, besides being a practical engineer, was made Chairman. For many years he has operated railways in India and he has a wide knowledge of transport problems of all kinds all over the World. At the same time he has a thorough grasp of aircraft construction as such. Thus Vickers (Aviation) Ltd. starts this era of Air Transport with the advantage of having as its Chairman the only man on the constructional side of the Aircraft Industry who is primarily a transport man.

Also on the Board is Air Commodore J. A. Chamier, C.B., C.M.G., D.S.O., O.B.E. Air Commodore Chamier was, until 1929, Director of Technical Development at the Air Ministry and for some years he has been in close touch with all development of aeronautical engineering.

Though he himself was a regular soldier and came into the Royal Flying Corps during the War, he is a born engineer. He disclaims technical knowledge but persistently displays a knowledge of technical affairs and, what is still more important, of practical engineering and of the practical side of aviation equal to that of aeronautical engineers who have a World-wide reputation. Air Commodore Chamier, for example, was primarily responsible for the adoption by the R.A.F. of slotted wings, which have saved



A CROYDON PRODUCT.—The AL-1 two-seat light biplane (95 h.p. Salmson engine) built by Surrey Flying Services Ltd.

USEFUL LOAD.—Some of the officers of No. 70 (Bomber) Squadron inside a Vickers Victoria troop-carrier at Hinaidi, 'Iraq.

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liarity about any machine owned by the Bolivian Government is that it must have a performance at a height of 15,000 feet which our ordinary aeroplanes at home put up at a matter of only a thousand feet or so. This is because the capital of Bolivia, La Paz, is itself at a height of 13,000 ft. or so up in the Andes and the aerodrome of the Bolivian Air Force is 1,000 ft. or more above this. Consequently Bolivian aviators live and have their being at a height which in this part of the World is something like the ceiling of ordinary light aeroplanes. That is to say the Bolivian army aircraft have to take-off with full war load under atmospheric conditions in which some light aeroplanes and still more of the much-vaunted commercial aeroplanes of other countries would not leave the ground at all.

Under these conditions the Vickers 143 puts up a performance which actually beats the sea-level performance of a great many war machines commonly in use to-day in the services of foreign Nations. For example at the aerodrome height of La Paz it has a speed of 176 m.p.h. whereas many single-seat fighters in this part of the World cannot exceed a speed of 150 m.p.h. And its service ceiling is 26,400 feet.

The Bolivian Army also has Vickers Vendaces for general training, and Vespas (supercharged Jupiter engines) for bombing and reconnaissance.

Another very interesting machine produced by Vickers in 1929 is the 151 type. This is a single-seat all-metal interceptor fighter. It is designed for high-altitude fighting and has a remarkably quick climb so as to get above invading aircraft. It is built entirely of duralumin, including the covering of the wings. And it is a monoplane of the low wing type. Its engine is a 500 h.p. Bristol Mercury. As the machine belongs to the R.A.F. no performance figures are available.

About the best known big aeroplanes in the World are the Vickers Victoria troop-carrier and the Vickers Virginia night bomber. Those so far used in the R.A.F. have been built of wood and have had water-cooled engines. As such they have quite a reasonably good performance. During 1928 and 1929 machines of this type have been produced built entirely of duralumin, covered with ordinary fabric, and fitted with geared Bristol Jupiter engines. The improvement in performance has been truly remarkable.

The metallised Virginia actually has a service ceiling which is precisely twice as high as that which it had before it was re-designed. That is to say instead of having a maximum height of about 12,000 ft. it now does 24,000 ft. with comparative ease.

Yet another remarkable piece of progress in 1929 has been the alteration of the Vickers Vellore, or rather its development from a single-engined machine to a two-engined or three-engined type.

Those who remember the extraordinary performance of the original Vellore as a weight-carrier and who recognised its possibilities as a cargo-carrier, will be interested to hear that as a twin-engined job, with two geared Jupiters or Jaguars, it puts up a speed which is actually comparable with that of some of our single-seat fighters of not so very long ago. And, though it is not supposed to be a passenger-carrying machine, it has a greater speed and a very much greater load-carrying capacity than have many of the best known three-engined passenger-carrying machines of other countries. It is, in fact, almost ideal for high-speed freight transport and mail carrying.

In foreign countries the high-speed mail-carrier is almost invariably a single-engined machine, which in the event of any engine trouble must come down as quickly as may be. The twin-engined Vellore is quite up to their performance, and has the additional advantage that if one engine fails it can carry on comfortably to a proper landing ground on the other engine. And if one engine merely shows signs of weakening the machine can probably finish the full scheduled journey.

Altogether the reformed Vellore is one of the most interesting aeroplanes one has met, but even it and its performance are surpassed by certain other Vickers machines now in process of building, which unfortunately one may not yet describe.

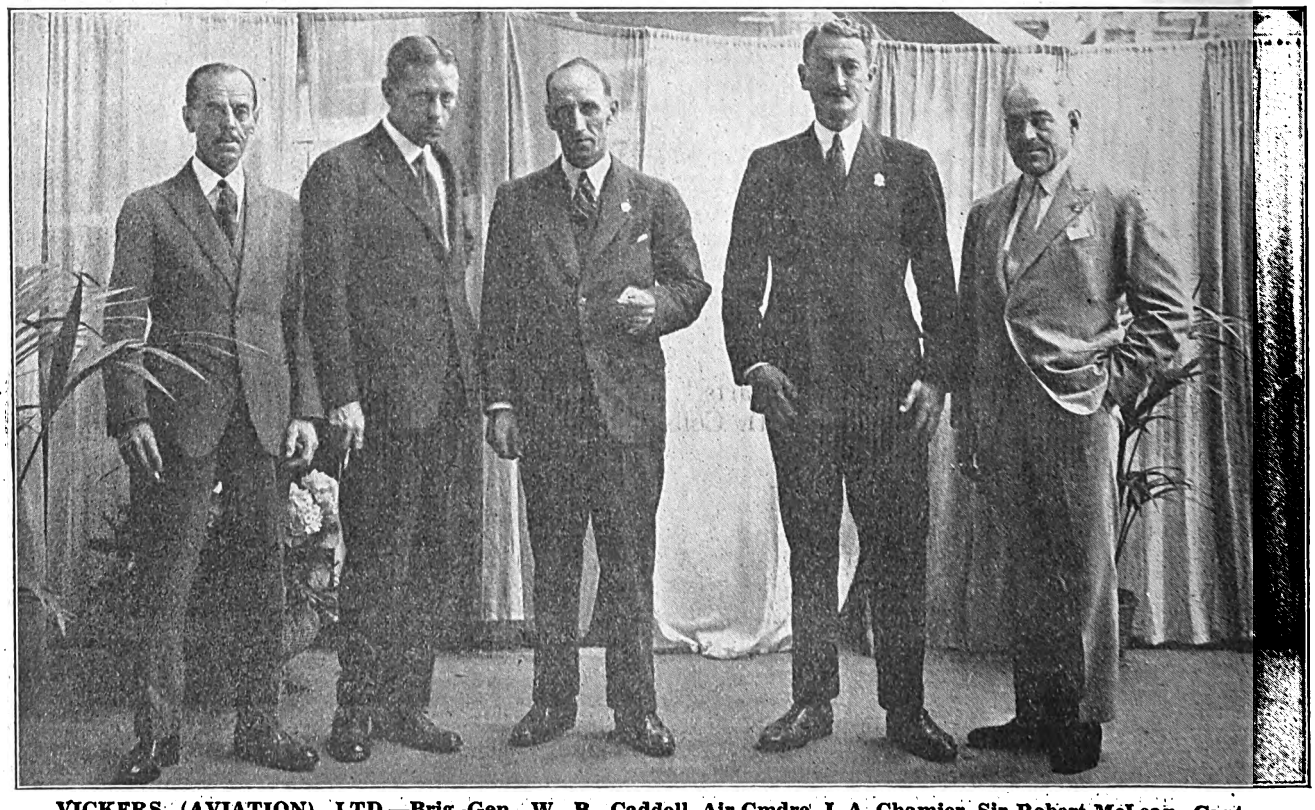
The Westland Aircraft Works.

This firm, which was started during the War 1914-18 as a branch of Petters Ltd., of Yeovil, the famous gas-engine and oil-engine makers, has of late come out as one of the World's leading manufacturers of war machines and civil transport machines.

Mr. R. A. Bruce, the Managing Director, is an engineer of long standing. In fact he worked with the famous Mr. Brennan on his early torpedoes. During the War Mr. Bruce was for some time in the service of the Admiralty as an engineer. He left to organise the Aircraft Department of Petters. And in that capacity he manufactured a large number of landplanes and seaplanes during the war, all of which were remarkable for the excellence of their workmanship.

After the War the Westland Works turned their attention, rather too soon unfortunately, to the production of civil aircraft, and built the Westland Limousine, which in its day was one of the best-looking machines of its type. But in that early time there was not the demand for civil aircraft which has since arisen.

The firm's greatest success came in 1928 when they produced the Westland Wapiti. This is a two-seat general-purpose biplane with the Bristol Jupiter or Armstrong Siddeley Jaguar geared engine. It is used for day bombing or for communication or for ordinary patrol work. As an ordinary landplane with the geared Jupiter engine, it has a speed of 142 m.p.h. at 5,000 ft. and with the Jaguar geared engine has a speed of 137 m.p.h. The Wapiti is also used on floats as a seaplane.



VICKERS (AVIATION) LTD.—Brig.-Gen. W. B. Caddell, Air Cmdre. J. A. Chamier, Sir Robert McLean, Capt. H. E. P. D. Acland and Major Henri Jullerot.—(*"Aeroplane" photograph.*)

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MR. SPOONER'S COMING OF AGE.

On Jan. 3 The Royal Aeronautical Society gave a Dinner to Mr. Stanley Spooner, the Editor of *Flight*, to celebrate the twenty-first anniversary of the first issue of that paper. The gathering was notable for the number of pioneers of aviation who were present. There were early pilots such as the Hon. Alan Boyle and Lt.-Col. J. T. C. Moore Brabazon. And there were early constructors such as Sir Alliott Verdon Roe, Mr. Oswald Short, Mr. Fred Sigrist, Mr. Handley Page and Mr. W. O. Manning (who dates back to 1907). And there were pioneer newspaper people such as Sir Edward Iliffe, for whose paper *The Autocar* one personally did the first report of an Aero Show in 1908; Major C. C. Turner, who had travelled by balloon to Russia in 1908; Mr. Hamilton Fyfe, who did *The Daily Mail's* report of the Reims Meeting of 1909; Mr. Pritchard, now Secretary of the R.Ae.S.; and Mr. Berryman, who was Technical Editor of *The Auto* before *Flight* began.

COLONEL THE MASTER OF SEMPILL, who presided, said that this was a family party of a Christmassy kind to mark the coming of age of the oldest aeronautical journal in the World and to show admiration for the modest and retiring individual who founded it. His Royal Highness the Duke of York had sent his sincere good wishes to Mr. Spooner that evening. The Secretary of State for Air, who had hoped to be present, also sent a special message commending the courage, foresight and energy of Mr. Spooner. And the Duke of Argyll, the son of the first President of the Aeronautical Society, himself a pioneer of flying, had also sent a message. Col. Sempill also quoted a message from Sir Frank McClean to the effect that those of us who had passed into aviation in 1909 and 1910 knew the value of Mr. Spooner's work and recalled that at that time a little sympathy was a great consolation among many crashes.

Col. Sempill said that we could imagine the difficulties of those days, and mentioned that Mr. Spooner had done much for aviation in his paper *The Automotor* before he started *Flight*. He, Col. Sempill, mentioned among the pioneer journalists as well as those who were present Mr. Harry Harper of *The Daily Mail*, whose health prevented him from attending, and Major Baden Powell, the oldest living member of the R.Ae.S., who published an aeronautical supplement to a paper called *Knowledge*, which he used to run in the dim past.

In conclusion Col. Sempill expressed the gratitude of the Society to Mr. Spooner for the support that he had given to it and for the loan of many photographs and blocks to the Society's Journal in the days when it could not afford such luxuries. He personally as the sixth President of the Society offered his cordial thanks to the guest of the evening.

LIEUT.-COLONEL MOORE-BRABAZON, who himself looks almost exactly as he did when he was flying at Eastchurch in 1909, said that he envied Col. Sempill's youth, but that we old-timers had the satisfaction of having been associated in our early days with the guest of the evening, whose astonishing courage and faith had done so much for aviation.

He said that he first met Mr. Spooner twenty-six years ago when he himself was a very Bolshevik young member of the Committee of the Automobile Club along with Mr. Spooner. Nobody showed more discretion at the meetings than did Mr. Spooner, but he well remembered being kicked under the table by Mr. Spooner to encourage his outbreaks. He recalled his first visit to Mr. Spooner's office where he found him sitting in a nest of papers and correspondence, so that he looked like a hen sitting on the egg of aviation. Col. Brabazon said that Mr. Spooner's twenty-one years of aviation was a regular fairy story, in fact it might be called the Blue Sky Fairy Book, for no fairy book ever showed greater imagination.

Now the paper had come of age and had reached years of discretion, and we were passing to the second part of this great movement. We were now out to seek World-wide markets and we must rely on our newspapers to help us get them. We were lucky to have two such able rivals. This, he said was an age of combines and mergers, but he hoped that the two papers, *Flight* and THE AEROPLANE, would never amalgamate.

This day marked a definite stage in progress. Getting the whole movement in the right perspective was difficult, but we should always be grateful for the work of our guest.

MR. STANLEY SPOONER said that he felt that he was not entitled to so much honour, but he did appreciate it. He was astonished particularly at receiving this kind message from His Royal Highness the Duke of York. Mr. Spooner said that he was not a speaker, but his heart and thoughts were so much in aviation that he could not refuse to speak on this occasion.

He had not wanted to come to this dinner but he could not upset Mr. Pritchard's arrangements and now he was glad that he had accepted it as representing the Staff of *Flight*. He said that no paper could have had a more faithful or willing Staff. They were all a happy family,—Mr. Poulsen, Mr. Vernon Jones, Mr. Prchazka, Mr. Yoxall, Mr. Hawkins, who had been with him thirty-four years, and Miss Galloway.

He recalled the optimism of people who had started in aviation in 1908 and even as late as 1913-14, and told how the late Lord Northcliffe had commended his foresight in starting an aeronautical paper, and how one of his most successful business friends had reproached him for being so foolish. He said that he had founded *The Auto* in 1896 and had begun publishing aeronautical notes in it in 1900 just when an eminent scientist had proved mathematically that human flight was impossible.

[This statement produced a little interlude in the form of an argument across the table between Dr. Merton, Chairman of the Air League, and Mr. Handley Page, as to whether Simon Newcome or Lord Kelvin was the scientist concerned.]

Continuing, Mr. Spooner recalled how in 1903, just three months before the Wright Brothers actually flew, he had described their gliding experiments and had added that very shortly they would certainly produce power-driven flight.

He made kindly reference to his earliest technical assistant, Mr. Berryman, now chief engineer of the Daimler Company, and said that whatever he had accomplished himself he would always recognise the co-operation of his Staff. He added that his Twenty-First Birthday Issue contained three hundred photographs of old times, every one of which had been taken by his Staff photographers.

He ended by thanking Col. Sempill for all that he had said about him, and remarked very rightly that Colonel Sempill deserved the thanks of the aeronautical community for resuscitating the Royal Aeronautical Society.

THE EDITOR OF THE AEROPLANE, called upon by the Chairman, recalled the story of the small boy who, when found playing by himself and asked whether he had no little friends, replied "I only have one little friend, and I hate *him*." He found himself in the position of having only one official enemy, Stanley Spooner, and he loved him

His only grievance against Stanley Spooner was that whenever they were discussing anything Mr. Spooner would talk about "you youngsters." He denied Mr. Spooner's assumed antiquity and disbelieved the rumour that Mr. Spooner had assisted at Sir Robert Caley's gliding experiments in 1808. He recalled that at a party at the Marine Experimental Station at Felixstowe only a year or two ago, on that historic occasion when the Aircraft Trade threw the R.A.F. out of their own Mess, Mr. Spooner, who said that he was celebrating his seventieth birthday on that day, assisted materially in the throwing.

Actually, the speaker said, he was not so much Mr. Spooner's junior, for this particular week, and possibly that particular day, was also the twenty-first anniversary of the publication in *The Autocar*, thanks to Sir Edward Iliffe, of his own first Aero Show Report.

He said that we certainly owed Mr. Spooner a debt of gratitude for starting the World's first aviation paper, and he wondered how the job was done with so little revenue. So far as he could see the only aircraft manufacturers of that period who survived to-day were Short Brothers and Mr. Handley Page and they must have been Mr. Spooner's only advertisers.

Mr. Spooner interpolated the remark that Mr. Handley Page was not an advertiser in the first issue. Whereupon the speaker said that at any rate he was making aeroplanes at a profit at the time.

Continuing, he emphasised the great value of Mr. Spooner's work to the Aeronautical Society in making the proceedings of the Society and their lectures available in a cheap weekly paper to people who could not afford the Society's monthly Journal.

Referring to Col. Moore-Brabazon's remark on amalgamation, he said that he felt sure that the ideal aviation paper would be one written by himself with Mr. Spooner looking over his shoulder and putting an accusing finger on certain paragraphs with the remark "Don't write that you damn fool." All the same he proposed to remain a friendly competitor of our guest.

He agreed with Col. Brabazon that this moment marked the beginning of the air transport epoch and that the Press must give every possible support to the British Industry, and added that the Industry must itself support the Press. He said that he hoped in a very few years to see every issue of Mr. Spooner's paper as fat as his Twenty-First Birthday Issue, and added that he would have no objection to THE AEROPLANE being equally fat.

By way of putting a finishing touch to the proceedings he suggested that the crackers with which the tables were decorated should be pulled simultaneously as a kind of *jeu de joie* in Mr. Spooner's honour, and that the Honourable Mrs. Forbes Sempill, who had been responsible for the artistic decoration of the tables, should be asked to honour the company by herself giving the signal. The result was eminently pleasing.

AIR VICE-MARSHAL SIR SEFTON BRANCKER, Director of Civil Aviation, ended the proceedings by proposing the health of the Chairman, saying that he was the best Staff Officer he had ever had. When they were working together during the War he himself knew that he could always go off duty anywhere and leave Col. Sempill to run the show for him. And he remarked that Col. Sempill was one of the greatest assets of Civil Aviation to-day.

After which the party mingled in conversation until midnight.

—C. G. G.

AN INTERNATIONAL DISPUTE.

The Times correspondent in New York in a message dated Jan. 5, 1930, states:—

Representatives of the Curtiss Aeroplane Company yesterday served Major James H. Cordes, representative of the Handley Page Company, with a writ, effective for 10 days, restraining the Handley Page Company from proceeding with the dismantling, in preparation for shipment abroad, of the Handley Page entry in the recent Guggenheim safe aeroplane contest. This was a counter-action to the filing by the Handley Page Company of a suit for $300,000 [£60,000] damages for alleged infringement of its wing slot patents.

The Curtiss representatives assert that the Handley Page Company, by a Court order granted in 1921, was prohibited for ever from importing aeroplanes into the United States. In stopping the dismantling of the Handley Page aeroplane at Mitchel Field they are preventing, they say, the destruction of evidence that the order has been violated. It is their purpose now to enforce the order.

Part of their defence against the Handley Page suit is an allegation that their aeroplane which won the Guggenheim prize was a purely experimental machine, and that no machines of its type were to be produced commercially until the patent matters involved in the dispute were amicably settled.

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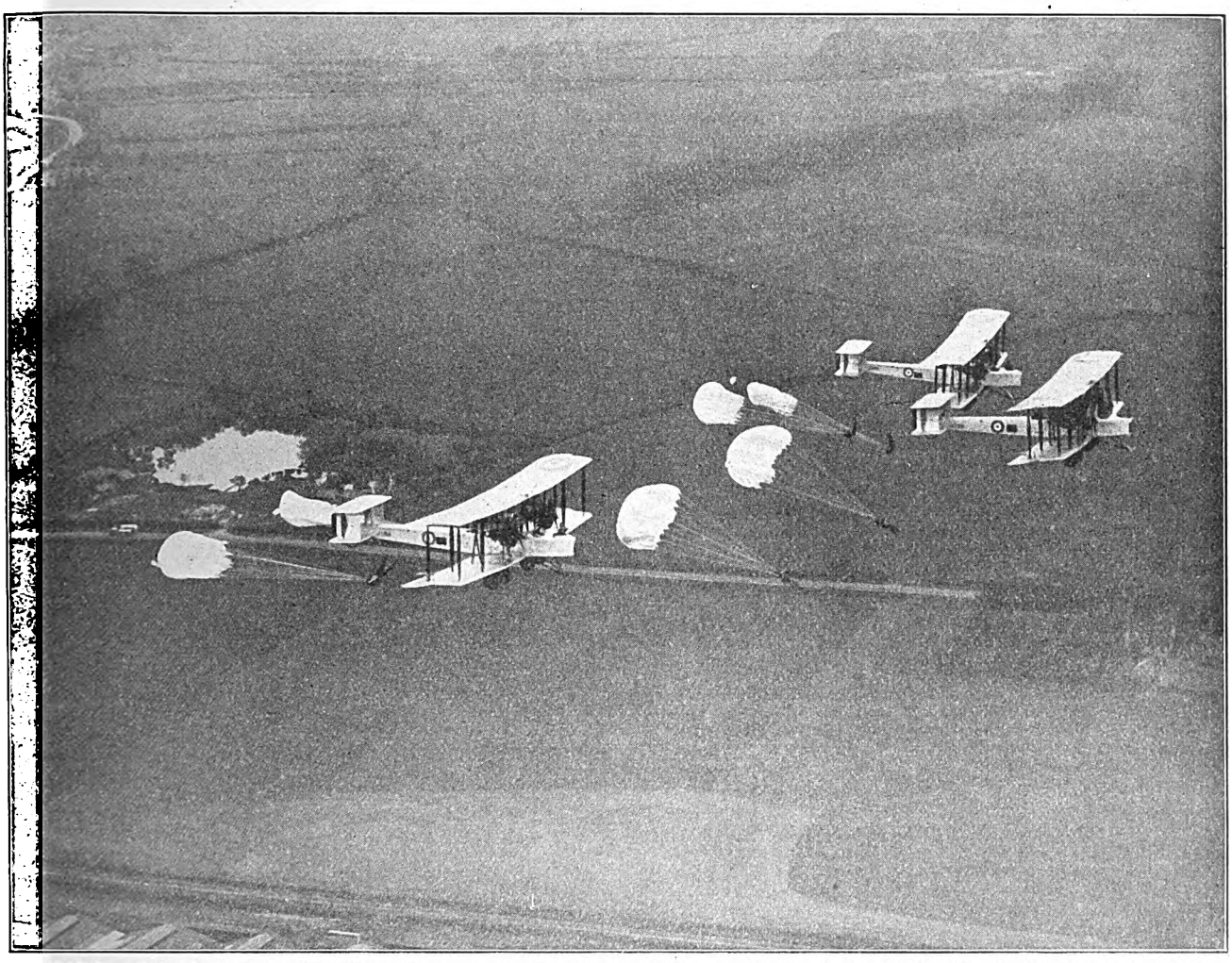

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MORE ABOUT THE GUGGENHEIM COMPETITION.

On Jan. 2 Mr. F. Handley Page gave a lunch party to a number of members of the Press to discuss with them the result of the Daniel Guggenheim Safe Aircraft Competition, as the papers of that morning had announced that the prize of £20,000 had been awarded to the Curtiss Tanager. Mr. Handley Page described the rules of the Competition and the way in which those rules had been interpreted by the Committee of the Competition.

The original rules certainly do seem to have been stretched or varied very considerably. One can quite understand that the Committee in charge of the Competititon found themselves in a very difficult position. Originally there were some twenty entrants. The day before the last day fixed on which competing machines could arrive at the field without being disqualified the Handley Page Gugnunc was the only machine on the spot. All the other European entries had been cancelled and none of the American entries had arrived,—which only shows that the Americans, like ourselves, have the habit of procrastination, and of finishing their machines on the starting line.

Faced with the position that this World-advertised competition looked like being a fiasco except for the one English entry, the Committee evidently relaxed the most essential rule, namely that if a machine was not ready in time it must be put out. Consequently a number of aeroplanes which arrived a few days late were allowed to have a try at the qualifying tests, and one was actually allowed to put in an appearance on Nov. 18

Very soon the fact became evident that the only two machines which had a hope of passing the conditions of the contest were the two machines with slots, the Handley Page and the Curtiss. Between these two machines there was the important difference that whereas the flaps on the trailing edge of the Handley Page machine were interconnected with the slots, and so worked automatically, the flaps on the Curtiss were hand-operated.

The result was that when the Handley Page machine was set to do that part of the stability test which, according to the original rule, included diving the machine and letting go the controls to prove that it would right itself, the slots closed, the flaps went up, and the wing assumed a normal shape, so that the machine passed the test. Under similar circumstances, when the Curtiss machine was diving, the slots closed but the flaps remained down and the machine became unstable on the dive.

This would have put the Curtiss machine out of the Competition altogether, and so, apparently, to prevent the Competition from shutting down forthwith, the Committee altered the rule to read that after diving the machine must right itself without the controls being handled,—*except those operating the safety devices.*

This rule applied equally to all entries, but, as there happened to be only one entrant left whom it could affect, the alteration had the unfortunate look of having been altered specially for the benefit of the Curtiss entry, which otherwise would have been put out of the Competition.

Obviously, unless these rules had been altered the Competition would have been a fiasco. But such alterations could not have happened if the Competition had been run under the regulations of the *Fédération Aéronautique Internationale* instead of under purely American rules. Consequently the Committee of the Guggenheim Fund have unhappily left themselves open to the charge that they altered the rules to make an American machine win.

Knowing several members of the Committee one feels sure that the true reason for altering the rules was to save the Competition for such a magnificent prize from being a complete fiasco, and so disclosing the barren state of Aeronautical Science all over the World so far as new and original ideas for safe aircraft were concerned. But one cannot help regretting the weakness of character which allowed such alterations merely to save the face of Science.

The word *fiasco* means an empty flask. And obviously the flask could not have been empty if the Handley Page machine had remained in it. But, the real trouble apparently lay in the fact that the Handley Page machine itself might in the end have been disqualified. And so the Competition would have been left utterly empty.

The trouble arose in this way. On all points the Handley Page seems to have beaten the Curtiss, with the solitary exception of the slow gliding speed, which was one of the most essential tests in the Competition. The rules laid down that the competing machines must glide at not more than 38 m.p.h. According to tests at Martlesham the Handley Page had a slow *flying* speed at about 33½ m.p.h. and a slow *gliding* speed of just under 38 m.p.h.

When tested in America the ordinary Pitot-tube tests showed a gliding speed of less than 38 m.p.h. But when tested with an "air-log" suspended below the machine it consistently showed 40. The pilot noticed that the instrument read at 40 m.p.h. at considerably varied gliding speeds. When he tapped the instrument it showed a lower speed, but, so far as one can gather, it did not get below the limiting figure of 38 m.p.h.

Possibly the machine actually reached a lower speed, but the instrument did not show it. Only a few days ago one was told by an R.A.F. test-pilot of great experience, that they had tried these air-logs suspended as much as 30 ft. below an aeroplane without being able to get away from the interference effect of the machine itself.

In any case, so long as the rules were interpreted by the instruments which were available the Handley Page machine does not seem to have reached the low limit fixed. And so we are all still left in doubt whether the Handley Page is even entitled to one of the five consolation prizes of £2,000 which were offered to competitors who passed all the tests.

Apart from these points, there is no doubt that the Handley Page machine did put up an extraordinarily fine performance. With an Armstrong Siddeley Mongoose engine of 150 h.p. the total weight was 2,250 lbs. The wing-loading was 7.4 lbs. per sq. ft. and the power-loading was 13.8 lbs. per h.p. This compares with 8.14 lbs. per square foot and 15.6 lbs. per h.p. of the Curtiss machine,—allowing that the engine in the Curtiss was of the horse-power stated in the entry.

There seems to be an opinion among some of those who were present that the engine of the Curtiss must have been considerably boosted beyond the declared output to enable it to reach the top speed of 112 m.p.h.

In the course of the tests the Handley Page machine actually pulled up in 21 yards after touching the ground in a head wind of only 8 m.p.h. It took off in 240 ft. instead of the 300 ft. allowed by the rules. And it cleared the 35 ft. barrier well within 500 ft. of starting.

One of the tests consisted of getting out of a marked area indicating a field 500 ft. square over a 25 ft. barrier. In the process the engine might be switched off at any moment by the observer in the machine. This at first seemed to be a dangerous proposition, but as the observer himself would be liable to be damaged along with the machine it was not actually as dangerous as it looked.

Speaking on the subject as a whole Mr. Handley Page said that at any rate the winning machine was fully slotted and all those which had no slots dropped out at the very start. He felt that there was some satisfaction in the fact that the research done on slots had been valuable.

The Competition had been worth while because it had brought out the tremendous value of slots. He had hoped for a competition between ideas such as the Autogiro and the Hill tailless type against slots, and not, as it turned out to be, a competition between two individual machines embodying the same main characteristics.

We must remember that sooner or later we shall have to sell aeroplanes to people who will buy their machines as they buy cars,—by the colour of their upholstery,—so our machines of the future must be fool-proof, and must be able to get down anywhere. There is not much to fall on in the wide-open spaces overseas, but, as Mr. Handley Page said, we must be able to descend vertically like a parachute. Which indicates the further development of slots and of better landing-carriages.

This fully agrees with what THE AEROPLANE has been preaching ever since slots were introduced ten years ago. The pity is that the use of slots is not ten years ahead of where it is.

Mr. Handley Page said that when these improvements had been achieved we could look forward to people using aeroplanes for week-end trips just as they now use motor-cars.

He said that an action for infringement of patent was now being taken against the Curtiss Company. When the Curtiss Company had been approached concerning their use of slots in the Competition they had answered that they were using the slots for a scientific test, and that they would discuss the question of patent rights afterwards. That question is now to be tried.

Mr. Handley Page concluded by saying that while in America he had been to Canada where the Slotted Wing Company of Canada had been formed, and that there were likely to be big developments in that country.

Naturally everybody in this country will regret that a British firm did not acquire Mr. Guggenheim's £20,000. But we have at any rate the consolation that the prize was won by a machine which depended on what is essentially an English development, and we naturally hope will be legally proved to be an English invention. And though the loss of £20,000 in hard cash is to be equally regretted, there is the certainty that the controversy which is bound to follow will give to the principle of slotted wings publicity which could not be bought for any money.

Meanwhile THE AEROPLANE has the satisfaction of seeing all this controversy over an invention, or a principle, which was strongly supported by this paper when it was first introduced, although scientists, aircraft designers, and constructors of all nations scoffed at it.—C. G. G.

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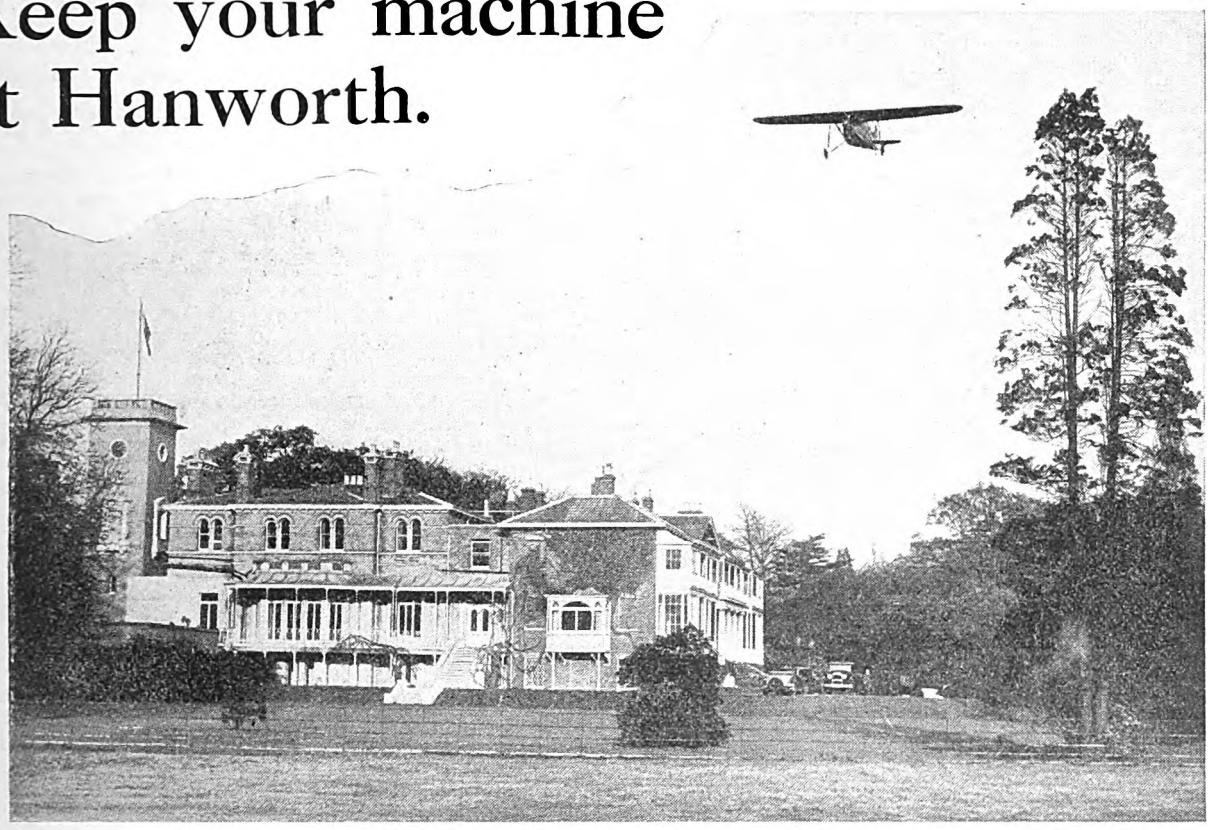

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THE POINT COOKE ACCIDENT.

On Jan. 6 at 4.30 p.m. (presumably Australian time) a flying-boat, stated in *The Daily Telegraph* to be a No. 2 Wackett Widgeon, fell into the sea from about 400 feet. The three occupants were killed. The accident happened close to the R.A.A.F. Base at Point Cooke.

Those on board were Capt. the Hon. Hugh Grosvenor, only son and heir of Lord Stalbridge, Flt. Lt. F. A. Briggs, R.A.A.F., and L-AC. Ewen, R.A.A.F.

According to a report in *The Daily Telegraph,* the flying-boat was returning to its base when it started to rock. Immediately after this the boat nose-dived into the water. The wreckage has been located in 30 ft. of water about a mile from Point Cooke.

The Hon. Hugh Grosvenor was shortly to have made an attempt to fly to England in record time from Australia. A Lockheed Vega was to have been used. Flt. Lt. Briggs was to have been relief-pilot and L-AC. Ewen one of the crew.

AN ACCIDENT AT HOLLYWOOD.

On Jan. 2, near Redondo Beach, California, two cabin aeroplanes collided at a height of 3,000 ft. and fell into the sea. The total complement of ten people, all employed by Fox Films Corporation, were killed.

Three machines were flying in Vee formation. An actor and his double in the foremost machine, and the others were to photograph a parachute jump from this machine.

The accident was caused by one of the following machines diving upon the other. This was apparently due to the pilots flying into the sun and being blinded by it.

THE FRENCH LONG-DISTANCE DISASTER.

The wreckage of the Nieuport-Delage monoplane in which MM. Lassalle, Rébard, and Faltot were attempting to fly from Paris to Saignon, has been found on the coast of Tripoli near Syrte after it had been missing for several days. The bodies of the three occupants were in the fuselage.

All will sympathise with our late Allies in the loss of three gallant men who, like our own R.A.F. officers, gave their lives for the development of Air Transport.

POLAR DISCOVERIES BY AIR.

Capt. Riiser Lansen and Lieut. Lutzow Holm, both of the Royal Norwegian Navy, who are members of a Norwegian Antarctic Exploration and Research Expedition, have discovered new land between Coats Land and Enderby Land in the King Haakon VII. Sea.

They left the vessel *Norvegia* in one of the two aircraft of the Expedition and alighted on an open stretch of water close to the shore. They then proceeded ashore on skis, hoisted the Norwegian flag and took possession of the land in the name of the King of Norway in accordance with the provisions of international law.

Later they flew back to the *Norvegia* which was then about 100 miles off shore.

HITCHING A WAGON TO THE SOUTH POLE.

On Dec. 21 President Hoover signed a Bill raising Commander Byrd to the rank of Rear-Admiral on the retired list of the United States Navy in recognition of his "extensive scientific investigations and extraordinary aerial explorations of the Antarctic continent and of the first mapping of the South Pole and the Polar plateau by air."

The rank, and pay of $4,500 (£900) per year, become effective immediately.

Rear-Admiral Byrd received his previous promotion to Commander also by Act of Congress after his flight over the North Pole. Having skipped the rank of captain he is now, at 41, the youngest Rear-Admiral on the list.

Here we may recall the fact that Admiral Byrd is not an aeroplane pilot. He has been the organiser and commanding officer of these expeditions, and has always been flown by hired aviators.

HIGH-SPEED CATERPILLARS.

At 11.58 hours on December 16 MM. Le Brix and Rossi left Le Bourget in a Potez 34 monoplane (600 h.p. Hispano-Suiza engine) in an attempt to fly to Saigon, Indo-China. At 06.40 hours on the following day they landed at Benghazi. At midday on December 17 they left Benghazi and at 11.15 hours on the following day they landed at Basrah.

At 15.00 hours on December 18 they went on from Basrah and at 15.00 hours on the following day they landed at Agra. It was their intention to fly to Allahabad, but they were forced to land at Agra by bad weather. They were held up at Agra by a flooded aerodrome until Dec. 21, when they flew to Allahabad. Here the state of the aerodrome again delayed them.

On Dec. 22 they left Allahabad for Bangkok. They passed over Calcutta and the Delta of the Irrawaddy but in the mountainous district near Moulmein, Burma, in darkness they were compelled to take to their parachutes. The machine was wrecked but both M. Le Brix and M. Rossi were able to reach civilisation. The latter has a fractured pelvis and will be in hospital for some six weeks.

The actual cause of the abandonment of the machine has not yet been made known.

In the course of this flight they covered 10,500 kms. (6,520 miles) from Paris to Agra in 75 hours.

FRENCH FUSIONS.

According to the Paris correspondent of *The Times,* the recent formation of *La Société Générale Aéronautique* by the association of the firms of Lorraine, Nieuport, S.E.C.M., Hanriot, Dyle et Bacalan, and C.A.M.S., has been followed by another grouping of firms even more comprehensive.

The firms of Breguet, Potez, Lioré and Olivier, Hispano-Suiza, and Renault are now to be associated with the *Air Union* and the *Compagnie Aéropostale.* The association in no way represents a fusion, for each member will retain its identity and independence, but is designed to afford a closer measure of co-operation.

The formation of such groups is in keeping with the declared policy of the French Government, which is anxious to eliminate the more wasteful forms of competition and the unrelated efforts of individual firms in favour of a greater measure of co-operation. The effect of such grouping tends to be cumulative, since the competition of groups already formed forces the hands of those who have so far held aloof. One of the reasons for the formation of the new group was, in fact, the existence of the *Société Générale Aéronautique.*

THE AIR POWER OF THE UNITED STATES NAVY.

The Daily Telegraph, quoting the annual report of the Bureau of Naval Aeronautics, says that the United States Navy has 829 aircraft of the most recent design under its immediate control.

The Fleet Air Arm has something over 130. The Americans, however, have their Air Force in two parts, attached to their Army and Navy. They do not have a separate arm like ourselves.

In spite of the difficulty of making a comparison, the strength of American naval aircraft is amazing. Out of this big total of machines 423 aeroplanes and 900 engines were bought during the fiscal year which ended in June 30, 1929.

SWITZERLAND TO AFRICA.

On Dec. 15, 1929, M. Mittelholzer left Zurich in a Fokker F.VII.3m named *Switzerland III* to fly to Central Africa under charter from the Baron de Rothschild of Vienna.

From Zurich to Cairo the machine carried in addition to the pilot, a second pilot, a mechanic, some passengers and 40 kgs. of mail. At Cairo the machine picked up the Baron de Rothschild's party and flew to Central Africa on a big game hunt. The latest news is that it has been flying over Mount Kenya, where no aeroplane has been before.

SIR ALAN COBHAM'S MISFORTUNE.

A *Reuter* report states that Sir Alan Cobham's machine is bogged at Mpika (Northern Rhodesia) and that he has decided to abandon it.

Sir Alan flew to Broken Hill (Rhodesia) in a borrowed machine. He is reported to have said that his forced landing was due to lack of petrol.

On Jan. 5 Sir Alan Cobham arrived at Livingstone (Northern Rhodesia) and on Jan. 6 left for Bulawayo, where he arrived the same day.

The report that he had been forced to abandon his machine at Mpika was incorrect. The machine was bogged for three days but when the aerodrome became drier he was able to fly away.

Reuter reports that Sir Alan will fly on to Salisbury, where he will leave his machine. He will go by train to Cape Town and there join Lady Cobham.

PARIS—MADAGASCAR.

On Dec. 12 Adjudant Roux, Ingénieur Caillol and Mécanicien Dodement left Le Bourget for Madagascar. Their machine was a Farman 190 (250 h.p. Lorraine radial air-cooled engine).

The Farman flew non-stop to Oran, where they refuelled. They next flew to Beni-Ounis, 5 km. (three miles) short of Columb-Bechar.

On Dec. 14 the Farman 190 reached Reggan, in South Algeria, where the machine was held up by a sandstorm for the whole of Dec. 15. On Dec. 16 the Farman left for Gao.

Bad weather has held up the progress of this flight. On Dec. 20 they left Bangui for Coquilhatville and at the latter place they were held up for two days.

By Dec. 27 they had arrived at Quilimane.

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The Long-Distance Attempt.

The following telegram was sent by the Royal Aeronautical Society to Lord Thomson, Secretary of State for Air, on Dec. 10:—

The Royal Aeronautical Society wishes to express the most profound sorrow at the great loss the Royal Air Force and aviation generally have suffered by the death of two very gallant officers—Squadron Leader Jones-Williams and Flight Lieutenant Jenkins. The Society has on several occasions benefitted by their vast experience and all the members have been keenly watching the attempt on the Long-Distance Record now so tragically and prematurely ended. Others will be proud to follow where they have led with such distinction.

(Signed) SEMPILL (President), Royal Aeronautical Society.

The following reply was received from Lord Thomson:—

Air Council are deeply moved by your kind message of condolence on the tragic loss of Squadron Leader Jones-Williams and Flight Lieutenant Jenkins in accident to monoplane on Long-Distance Flight.

(Signed) THOMSON, Secretary of State for Air.

Rugby Football.

Royal Air Force versus The Police:—The R.A.F. Representative side opened their season well by beating the Police at Imber Court, Thames Ditton, on Jan. 4 by two goals (10 points) to one goal (5 points). The game was a particularly hard one and the R.A.F. played as well in the second half when they were against the wind and in defence as they did in the first half when they kept the game continually in the Police twenty-five. The Police proved as tough a proposition in the field as they looked on the programme, with ten International players in their team, and the R.A.F. had to go full out all the way to hold them.

Plt. Off. Ievers was particularly sound at full back. He fielded brilliantly, kicked a good length and above all was always in the right place. The three-quarters handled well and used initiative in attack and were reliable in defence. At scrum-half Flg. Off. Maclean was one of the outstanding players on the field. He never missed an opportunity given him by the forwards and sent out fast, accurate passes besides playing a valuable part in defence. Even an injury in the second half which would have made a casualty of a good many players did not subdue the vigour of his offensive.

The forwards were in every way up to the high standard which is a tradition in R.A.F. representative sides. Except for Flg. Off. Beamish, who is one of the finest forwards playing Rugger to-day, none of them can be singled out as being better than the others.

The first Air Force try was scored in the first minute of play by Llewellyn from a break by Odbert followed by a punt ahead by White. Llewellyn kicked the goal. The Air Force kept up the attack for another 15 minutes and then Pott gathered the ball and ran across the field and in for Llewellyn to convert a second goal. The wonderful kicking of Everson the Police full-back drove the Air Force back for a few minutes but White broke away for a fine run before he was tackled ten yards from the Police line. The Police worked steadily down the field and the R.A.F. were forced to touch down. A good forward rush brought the game back into the Police twenty-five.

Early in the second half Ievers defeated three separate Police attacks with accurate fielding and touch-finding. A good forward attack in which Beamish, Kerby and Franks were prominent was held up by the Police rear ranks. A dangerous Police three-quarter movement broke down with a forward pass. Shortly after the Police scored a well-deserved try on their right wing, when C. Thomas got over, and temporarily laid out himself and an Air Force player in the effort. Everson converted. The Police made a desperate effort to save the match in the last ten minutes but first-class tackles by Pott, Ievers and Maclean saved the situation.

The R.A.F. team were:—Plt. Off. Ievers; Plt. Off. White, Flg. Off. Pott, Plt. Off. Llewellyn, Flg. Off. Cotton; Flt. Lt. Odbert, Flg. Off. Maclean; Plt. Off. Williams, Flg. Off. Beamish (Captain), Sjt. Kerby, Flg. Off. Franks, Flg. Off. Constantine, Sjt. Hall, L-AC. Maxwell, Plt. Off. Gillan.—C. M. MCA.

The Inter-Unit Rugby Football Cup Competition.

The preliminary and first rounds in the competition for the R.A.F. Inter-Unit Rugby Football Cup have now been played with the following results:—

Preliminary Round.—Halton beat Shrewsbury 10—0; Sealand beat Cranwell 34—6; Digby beat Wittering 12—11; Ruislip beat Kenley 24—0; Upper Heyford beat Uxbridge 11—8; South Farnborough beat Calshot 18—3; Gosport beat Tangmere 14—0.

First Round.—(Midland Division): Sealand beat Halton 6—5; Digby beat Bircham Newton 59—0; Henlow beat Grantham 36—3; Felixstowe beat Martlesham 3—0. (South-Eastern Division): Ruislip beat Upper Heyford 3—0; Manston beat Duxford 13—9; Eastchurch beat North Weald 5—3; Northolt beat Bicester 3—0. (South-Western Division): Gosport beat South Farnborough 15—0; Lee-on-Solent beat Upavon 14—0; Worthydown beat Netheravon 15—6; Andover beat Mount Batten 11—0.

The semi-finals will be played on Mar. 5 and the final on Mar. 26.

The R.A.F. Fencing Union.

The Inter-Unit Fencing Competition will be fought off this year in two classes as follows:—

Senior Class (Stations of 500 and over) Entrance fee £2.
Junior Class (Stations of under 500) Entrance fee £1.

All rounds, including semi-finals and finals, will take place at the School of Physical Training, Uxbridge, on Feb. 27 and 28, 1930. Teams should arrive on Feb. 26. There will be a roll-call at 08.30 hours on Feb. 27.

Entries, with entrance fees, accompanied by requests for any necessary accommodation for competitors, should reach the Commandant, School of Physical Training, R.A.F. Depot, Uxbridge, not later than Feb. 7.

War Service Information Wanted.

For the purpose of historical reference an effort is being made to collect squadron markings, squadron colours and crests, colouring of machines and other interesting details of all war-time squadrons of the R.F.C., R.N.A.S., and R.A.F.

Will anyone who can supply any of the above details concerning squadrons in which they served please send them to THE AEROPLANE, 175, Piccadilly, W.1, marking their envelopes "Historical."

The Royal Air Force Quarterly.

The first issue of the Royal Air Force Quarterly has just been published and is a magazine of which the Royal Air Force in general and its producers and contributors in particular may well be proud. There are over 200 pages of reading matter including many valuable articles by experts in their own particular subjects.

Under the heading of Personnel, Organisation and Administration is an article on Service in the R.A.F. by Air Vice-Marshal Sir Philip Game, whose article is written in the hope of interesting non-Service people, which undoubtedly it will do. Another article in this section, by Sq. Ldr. R. Graham, gives useful advice on preparing for the Staff College.

In the Operations and Intelligence section is an article on Air Strategy by Wing Cdr. A. G. R. Garrod, and an article on Co-operation between the Army and the R.A.F. in 1929, by Wing Cdr. T. L. Leigh Mallory.

Sq. Ldr. A. H. Orlebar, Colonel the Master of Sempill and others have contributed to the section dealing with Research and Technical Development.

There are four short stories, two articles on History and Travel, and several articles on Civil Aviation at home and abroad.

The R.A.F. Notes are comprehensive and up-to-date and there is an adequate list of forthcoming events.

The illustrations are interesting and many of them beautifully reproduced. They include two coloured pictures, four in photogravure, twenty in monochrome and a few line drawings and maps. The only thing in the publication which calls for adverse criticism is an alleged portrait of Sir Hugh Trenchard, which is not in the least like him, and is definitely badly drawn, though the printing is very good.

The Royal Air Force Quarterly is edited by Sq. Ldr. C. G. Burge, R.A.F. (retired) and published by Gale and Polden Ltd.

Copies may be had from THE AEROPLANE Book Department, Cannon House, Pilgrim Street, E.C.4, at 8s. per copy, post free.

A New Book.

An interesting new book has been received,—and will be reviewed in THE AEROPLANE as soon as possible,—entitled "Above and Beyond Palestine." It is an account of the work of the East Indies and Egypt Seaplane Squadron 1916-18, with illustrations by the Author.

The book, which is published by Ernest Benn Ltd., may be had from THE AEROPLANE Book Department, Cannon House, Pilgrim Street, E.C.4, price 10s. 6d. (postage 6d.).

Central Flying School Categories.

The following officers and airman pilots who attended the Flying Instructors' Course at the Central Flying School from Oct. 1, 1929, to Dec. 18, 1929, have been categorised as indicated:—

A.1. Maj. J. L. Findlay, M.C. (N.Z.A.F.).

A.2. Flg. Off. G. V Carey, Plt. Off. J. T. Stephenson.

B. Flg. Offs. G. D. Harvey, H. A. Purvis, A. M. Stevens, J. B. Veal, P. H. Smith, C. H. Appleton, L. W. Howard, G. H. Proctor, H. A. Constantine, I. G. E. Dale, I. McL. Cameron, A. P. Miller, F. G. Wait (R.C.A.F.). Plt. Offs. H. J. Pringle, J. Mitch, F. Whittle, H. R. Dale. No. 348437 F-S. J. G. Freeman, No. 361858 Sjt. C. W. H. Webb, No. 342580 Sjt. J. M. Edwards, No. 362169 Sjt. J. S. Simons.

C. Flt. Lt. E. A. Hodgson, Flg. Off. M. C. Collins, Flg. Off. J. F. McKenna. No. 362622 Sjt. A. G. Ratcliffe.

D. Flt. Lt. C. P. Steventon.

The Royal United Service Institution.

A lecture on the Stragetical Mobility of Air Forces will be given at the Royal United Service Institution on Jan. 22 at 15.00 hours by Group Captain C. L. Courtney, C.B.E., D.S.O., *p.s.a.*, Deputy Director of Operations and Intelligence, R.A.F.

Members of the R.U.S.I. may introduce two friends to this or any other lecture.

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January Sports Fixtures.

Association Football:—Jan. 9, R.A.F. v. Football Association at St. Albans. Jan. 18, R.A.F. v. Corinthians at the Crystal Palace.

Boxing:—Jan. 10, R.A.F. v. Civil Service at the Stadium Club.

Hockey:—Jan. 11, R.A.F. v. Southgate at Southgate. Jan. 15, R.A.F. v. Bedford County at Bedford. Jan. 22, R.A.F. v. Civil Service at Stanmore. Jan. 29, R.A.F. v. Oxford University at Oxford.

Rugby:—Jan. 18, R.A.F. v. Bristol at Bristol. Jan. 22, R.A.F. v. Cambridge University at Cambridge. Jan. 25, R.A.F. v. Northampton at Northampton. Jan. 30, R.A.F. v. Leicester at Leicester.

Fencing:—Jan. 20, R.A.F. v. International Club Union at Uxbridge. Jan. 24, R.A.F. v. Tassarts at Salle Tassart. Jan. 29, R.A.F. v. University of London Fencing Club at Bertrands.

AIR SCOUTS AND GUIDES.

A movement of very considerable interest and importance to those who believe that an interest in Aviation in general and the Royal Air Force in particular is an essential part in the education of the rising generation, has been started at the Royal Air Force Station at Cranwell.

This movement is the formation of squadrons of Air Scouts and Air Guides among the children of past and present personnel of the Service. Although the squadrons are at present confined to Cranwell, the organisation is so based that the movement can extend to R.A.F. stations all over the World. In fact, it would be very difficult to prevent the enthusiastic youngsters themselves, apart from their officers, from founding new squadrons when they are posted from Cranwell to other stations.

The 1st Squadron, Cranwell Air Scouts, was formed in November, 1928, by Sjt. Major Beresford with the object of providing healthy recreation for the sons of R.A.F. personnel, past and present, on the station. Apart from recreation and games, two nights a week are devoted to teaching these boys to become useful citizens. A smart, distinctive uniform of Air Force blue material is supplied free of charge to the boys, each of whom subscribes 2d. a week to the Squadron.

At the end of 1928 there were 28 members and at the end of 1929 the strength was 54. The Squadron has an excellent football team, which plays local school teams. The boxing is of a particularly high standard, especially among the younger boys, and shooting is very good all round.

The Squadron has its own billiard table, bagatelle table, table tennis, badminton, deck quoits, rings, darts and other games. Various useful subjects are taught, which include Signalling (Morse code), First Aid, Knotting and Splicing, Athletics, Gymnastics, Boxing, Shooting, Woodwork, the Internal Combustion Engine, Aircraft Construction, and General Knowledge, all of which are very popular with the boys.

No. 1 Squadron, Air Guides, Cranwell, was started in May 1929 with 28 members and at the end of the year had increased its membership to 50. The object was to get together as many as possible of the daughters of the past and present Air Force personnel, to encourage comradeship and to teach useful occupations and give them something to do when they are not at school. The Squadron is divided into three Flights, Moths, Bluebirds, and Fawns, each in charge of a Flight Leader.

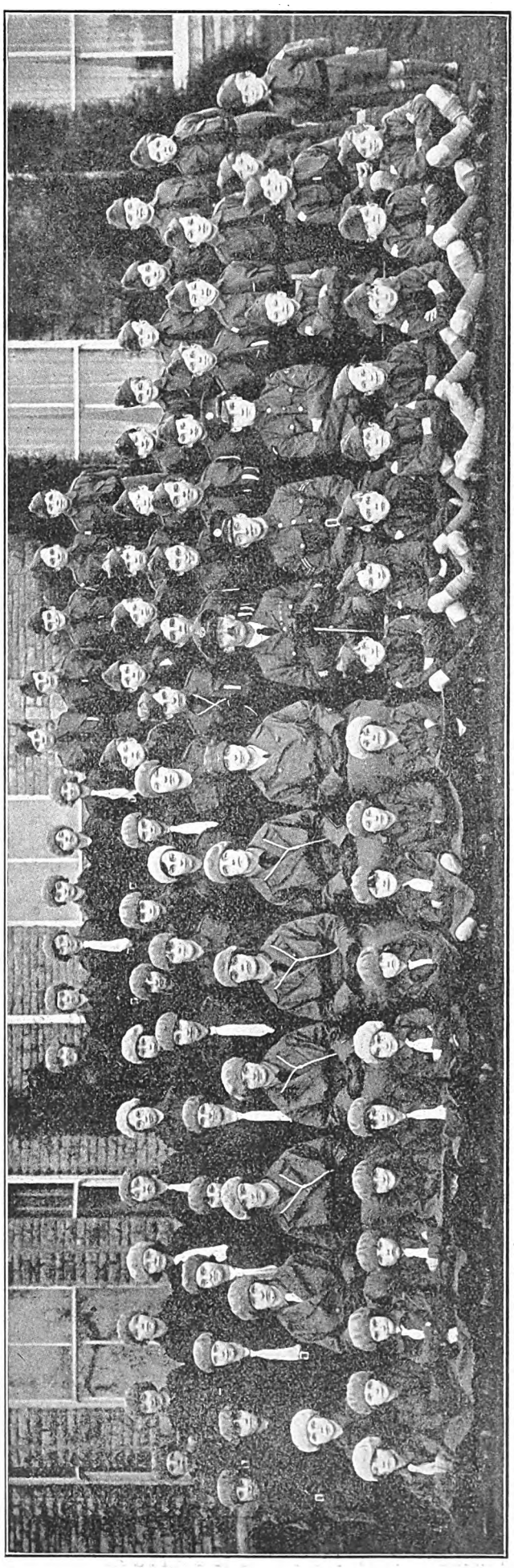
A simple and distinctive uniform of Air Force blue is provided free of charge to each Guide and is returnable when she leaves the Station unless she buys it for herself. Each Guide subscribes 1d. a week, or ½d. from the younger ones if there are more than one in each family.

A roll-call and inspection is held once a week, when marks are given for cleanliness, order, punctuality, etc. In addition to instruction in drilling, games, dancing and gymnasium, certain tests are made for the various classes of Guides. These tests include such useful accomplishments as carrying messages correctly, simple first aid, laying and lighting a fire, making tea, darning, and elementary squad-drill and physical training.

More senior Guides are expected to learn simple cookery, more advanced first aid and physical training, how to find important points on the camp, such as the fire station, the medical officer, the duty pilot, etc., and to know the different ranks in the Service, and to recognise the aircraft on their own Station.

The officers of both the Air Scouts and the Air Guides consist of members of the adult population of the Station, who willingly give time and trouble to this most worthy task.

During a recent visit to Cranwell one had the pleasure of seeing the Air Scouts and Air Guides on parade and one was very much struck with their smart appearance and general air of efficiency. Their march discipline has the essential accuracy which descended to the R.A.F. through the R.F.C. from the Guards.—C. M. MCA.



THE RISING GENERATION.—The Air Scouts and Air Guides of the R.A.F. Station, Cranwell, with their officers. In the middle of the second row from the front is Mrs. F. C. Halahan, Chief Commandant of the Air Guides, and on her left is S-M. Beresford, the founder and chief of the Air Scouts.

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TOOLS FOR INCREASED OUTPUT.

The firm of Black and Decker of Slough who are the latest firm to recognise the importance of the British Aircraft Industry, wish to get into touch with British aircraft firms with a view to supplying the latters' needs for electrically operated tools. Black and Decker Ltd. are allied to the famous American toolmakers of the same name, the enterprising President of whom, Mr. Black, as reported in THE AEROPLANE of Dec 25, has purchased a six-seat monoplane for the use of his staff.

Black and Decker make a large range of equipment but there are, one ventures to suggest, two particular types of equipment which are of especial interest to the Industry. The first is for reconditioning valves and seatings of aero-engines. The second is a special type of portable electric tool for quantity production.

The reconditioning tools are used extensively in America and amongst other users in the Dominion by the De Havilland Aircraft of Canada Ltd., whose Mr. Loader told one that Black and Decker's tools are really good.

These Aircraft Valve Tools are designed to re-face valve seats and re-true valves with a minimum of trouble and a maximum of accuracy. The re-seating tool has a reamer of cone shape formed to the particular angle required. This is rigidly attached to the pilot-spindle, which carries two cones and is inserted in the valve-guide. One cone centres the pilot at the bottom of the guide and the other does the same at the top. Over the pilot, where it protrudes at the top of the cylinder-head, is fitted a screwed expanding sleeve to apply pressure to the reamer. Over the top of this fits the two-handled lever for rotating the reamer.

When in the course of time the cutting edges of the reamer becomes blunted, the reamer can easily be refaced in the electric Valve-Refacing Tool.

As its name implies this tool is for re-facing valves and is in two main parts. The grinding-wheel with its electric motor forms one part. The separately driven chuck-spindle for holding and rotating the worn valves is the other. The valve can be set at any angle from 15 to 90 deg. and is revolved at slow speed by its own motor. The grinding wheel is mounted on screw-operated slides for feeding and traversing. This tool can be supplied in all voltages.

Obviously these two sets of equipment are really a necessity for any firm that has much maintenance work to do. Air-parks and municipal aerodromes which intend to cater for the private owner would do well to invest in them. Clubs too could materially help their ground engineers in the busy months by having these tools on the premises.

The firm also produce a range of electric drills of the Universal Motor type as well as their Marschke electric grinders for heavy duty. Also Black and Decker have a range of tools which they especially advocate for quantity production and these tools are known as the High Cycle Portable Electric Tools.

These tools have been produced to meet the competition of compressed-air tools and to obviate the disadvantages, especially those of heavy maintenance charges, which arise from the use of Universal Motored drills. Such disadvantages are the windings on the armature which must be held in place against high centrifugal forces and heavy overloads, and commutators which are subject to wear from the sliding contact of the brushes on them. Commutators are liable also to grounding and short-circuiting from the dirt that is ever present on them. Soldered joints between the coil-leads and the commutators are also a source of trouble. Heavy overloads cause commutators to weaken and open up. Brushes wear away and need frequent renewal.

Black and Decker argue that in compressed air tools the number of moving parts make for maintenance costs in renewing worn parts. Leaky valves and ports increase air consumption. Leaks in the supply-hose and pipe-lines are always a source of trouble and incidentally increase costs by reducing the effective pressure at the tools. Of course these troubles are not inevitably present in all compressed-air plants and tools using air have been produced which have remarkably few moving parts.

An electric tool is now being marketed by Black and Decker which operates off a three-phase 180 cycle A.C. current of either 220 or 110 volts. The first advantage of this is that the type of motor used is of the induction type and has the squirrel-cage type of armature. This latter has no windings in the accepted sense of the word, but uses instead copper bars inserted through slots in the punchings with short-circuiting rings rivetted to them. As a result the rotating member or armature is extremely robust and in practice more or less indestructible, and it needs the least amount of maintenance.

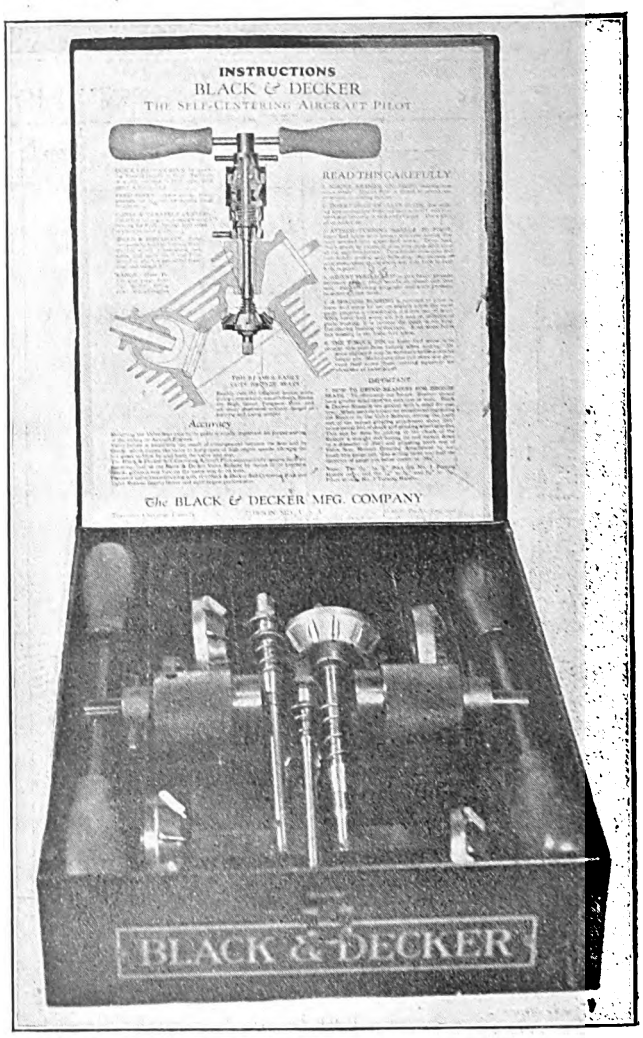
A further advantage is that a motor of the same power as the other types is considerably lighter and of less bulk. The range is not confined to drills, but includes machine screw-drivers, nut-runners, portable buffing wheels and reciprocating hammers of the type used for drilling stone and rivetting.

As three-phase 180 cycle alternating current cannot be obtained direct from the power stations a frequency changer at the Works is necessary. This can be operated either from direct or alternating current. For this reason the High Cycle Portable Electric Tools are not recommended by the firm unless the users intend to start off with at least ten tools. Otherwise the cost of installing the frequency changer is too heavy. The cost of the installation compares favourably with compressed air but not with the ordinary Universal Motor type of electric drill.

When the question of maintenance is considered the High Cycle Tool has the advantage,—and in the end it is the maintenance cost which counts. Because of the low cost of the power supply the High Cycle tools are much cheaper to run than most compressed air equipment. One has some American figures of comparative tests made with these High Cycle Drills and American compressed-air tools which show that for a nine-hour day the cost of power for the electric tool is one-eleventh of that required for the air-driven competitor. Such figures must however obviously vary with local conditions.

Everybody knows and often quotes the old adage about a good workman not grumbling at his tools. Obviously the better the man and the more experienced he is the less his employer should handicap him by lack of good tools. The better the tools and the greater the facilities that a good workman has the more work he will produce in a given time. The ultimate criterion is the amount of work that a really good man can produce in a given time, regardless of how high a wage he gets or the cost of the expensive tools you give him.

The Aircraft Industry in this country has done an enormous amount of development work in the past few years. Now we all hope to see the return of the bread from the waters in the shape of big sales here and abroad, which will mean quantity-production in the workshops. Quantity-production means the increasing use of high-speed tools and no doubt among such tools High Cycle Portable Electric equipment will find its place.—T. J.



TIME-SAVING.—The B. and D. Valve Set.

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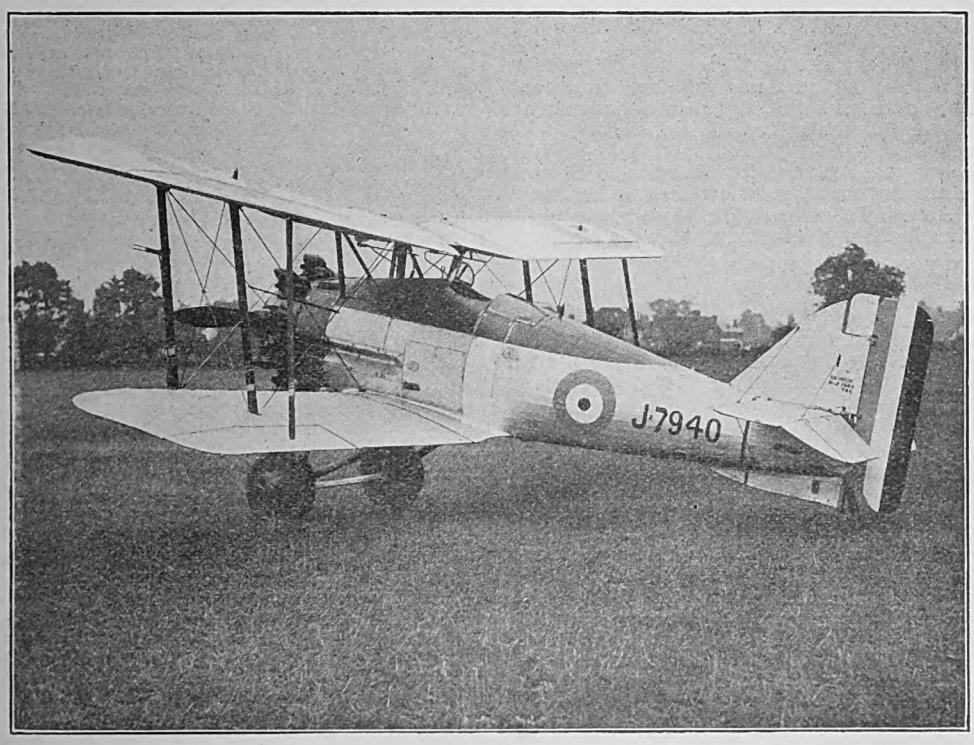

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COMMERCIAL AERONAUTICS.

AN EXTENSION TO THE INDIAN AIR MAIL.

On Dec. 30 the first air mail left New Delhi for Jodhpur, Hyderabad and Karachi where a connection will be made with the line to Croydon. From the report in *The Times* one gathers that a three-engined D.H. Hercules (450 h.p. Jupiter engines) has been chartered by the Indian Government from Imperial Airways for this route.

The publicity department of Imperial Airways have no information other than the postal information issued by the P.M.G.,—which seems strange.

A correspondent in India says that a contract has been signed by Eastern Airways Ltd. with the Indian Government for an extension of the mail service between Karachi, Delhi, Calcutta and Bombay. This has already been announced as incorrect by the British Press.

One inclines to the view that owing to the difficulty of forming a company with the Native preponderance required by the Indian Legislative Assembly, the Indian Government has decided to do the job itself.

DAMASCUS—BAGHDAD.

The Beirut correspondent of *The Times* in a letter dated Jan. 4 says that the Air Union has concluded agreements with the Franco-Syrian and the Anglo-Iraqi authorities which will allow Air Union the use of the military aerodrome at Damascus and the civil aerodrome at Baghdad.

Air Union are now making trial flights between the two places with the ultimate intention of connecting Damascus with the Indian Air Mail Service. The time between the two cities is 6½ hrs. including refuelling at Rutba Wells.

A CUSTOMS' SEADROME FOR LIVERPOOL.

Liverpool has now a Customs seadrome for marine aircraft carrying passengers and light baggage. A portion of the River Mersey bounded on the north by Rock Ferry Pier, has been approved by the Secretary of State for Air with the concurrence of the Commissioners of Customs and Excise for the purpose.

One wonders whether this will prove an added inducement to fly the Atlantic next Summer?

THE AIRPORT OF MANCHESTER.

Negotiations are proceeding apace for the recognition of Chat Moss as a Customs Airport. The Aerodrome Special Committee have recommended that adequate hotel accommodation shall be provided. This recommendation has been approved by the Finance Committee and now awaits the sanction of the City Council.

The idea is to spend £5,300 on altering and enlarging a farmhouse on the aerodrome. The converted premises should then be leased at a rent high enough to cover these costs and the present value of the farmhouse. The committee are already negociating with a local hotel company. The annual charges for interest and sinking fund will be £376.

OPPORTUNITIES IN THE WEST INDIES.

Mr. Alan Chorlton writing to *The Times* from Trinidad says:—

One cannot sojourn long in this most attractive island without becoming aware of its almost boundless possibilities as a centre of air travel for the Caribbean Sea and the northern States of South America, as the *entrepôt* for the long-distance flights from north to south, and as a *point d'appui* in the Confederation of British West Indian Islands.

Its position seems unrivalled both geographically and in its possession of ample supplies of native fuel and the superb airport it has in the land-locked Gulf of Paria. The French have been here, and the Luft Hansa, no doubt also realising its value as an airport, have sent Mr. Merkel to investigate its possibilities. He spoke of Trinidad as the cross-roads of the Caribbean and foresaw a great future for Port of Spain as an air traffic centre.

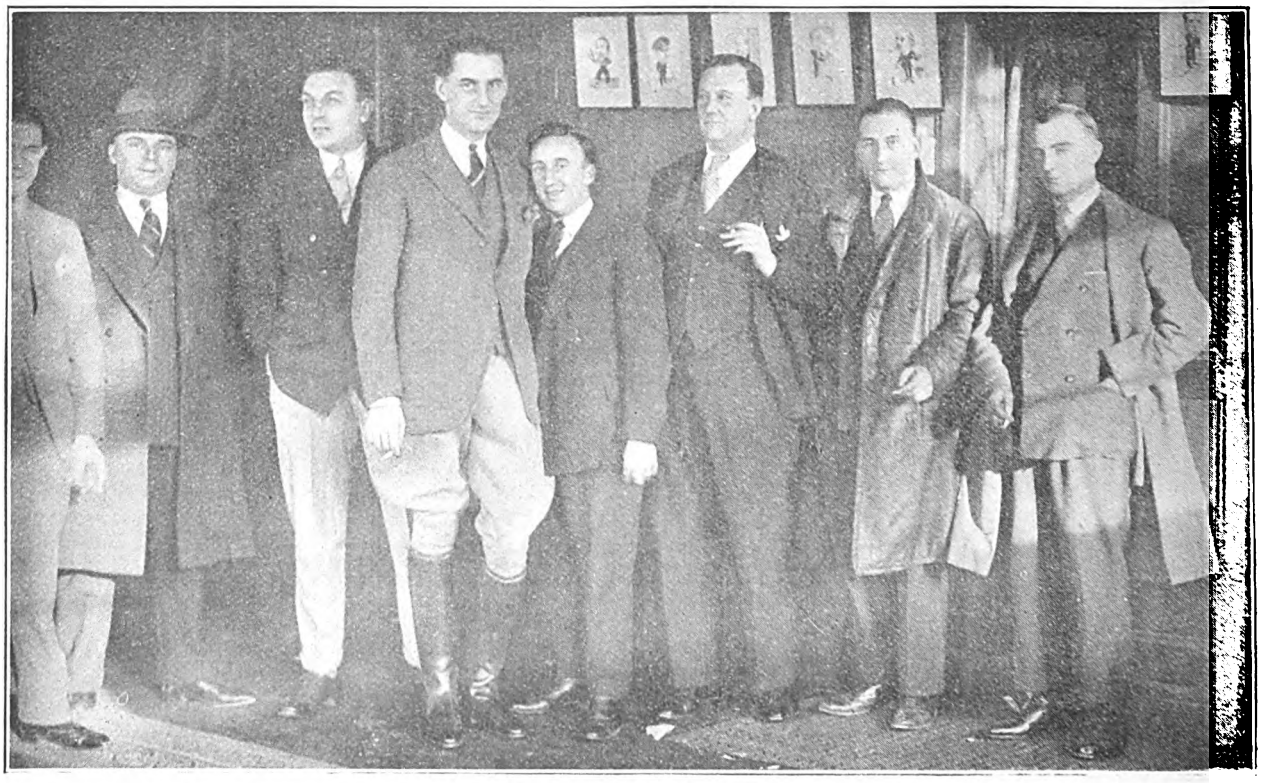
The Americans fully value these factors, and there are two companies already at work. Only the other day I saw a large 30-seater boat seaplane pass over on its way south to Rio de Janeiro.

All, it would seem, visualise the future of the place except the British, or we see it but seem unable to do anything towards grasping our opportunity, for surely, if we delay much more, all chance of establishing an effective service will be lost.

We have but one small company struggling, but it appears unable to make much progress without a subsidy, which from a local source is unlikely, while those from home seem already bespoken for other routes. This company, in association with others, might make a success with a service linking up Barbados and British Guiana with Trinidad, and perhaps also some of the farther islands, but by itself it cannot hope for much.

We do not realise the value of national propaganda. The Americans do, and are constantly impressing the potential buyer with their leadership in commerce, which often is brought about by something quite different from the particular product concerned. They are impressed by air traffic. A flight of airboats like that which Group Captain Cave took to the East would, by visiting all the islands, result in an unquestioned gain to British trade apart from its value to air transport.

The necessity for direct support to a local air line by the Home Government must be realised at once, and it is to be hoped the new Government will be duly appreciative of the position to British trade, as they are showing in connection with sugar.



OUR AIR TRANSPORT WORKERS.—In the Pilot's Room at Croydon Aerodrome Hotel,—Left to right: Mr. Dismore, of Imperial Airways; Mr. Jeffs, of the Control Tower; Mr. Drew and Mr. Matthews; Mr. Muir, of Surrey Flying Services; Mr. Allen and Mr. Thomas.

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ALL THE WORLD'S AIRCRAFT, 1929.

Edited by **C. G. Grey.**

Compiled by **Leonard Bridgman.**

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Part 2.—Modern aeroplanes of all Nations, illustrated by photographs and scale drawings with complete specifications and performance figures of current types. (Over 600 aeroplanes and as many photographs.)

Part 3.—Aero engines of all Nations with photographs of every type and the component parts of the more important engines. (Heavy-oil, compression-ignition and swash-plate engines are the chief new features.)

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[*In all about 900 illustrations.*]

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NORTHERN AIR TRANSPORT LTD.

On Jan. 1, 1930, Northern Air Transport Ltd. completed its move from the temporary aerodrome at Northenden (Whythenshawe) to the new Air Port of Manchester, Barton (Chat Moss), Lancs., to which address all communications should be sent in future.

Northern Air Transport Ltd., which incorporates Northern Air Lines Ltd. and Berkshire Aviation Tours Ltd., has been in operation in the Manchester district for some time, but has had to operate from a temporary aerodrome until the establishment of the new Manchester Air Port which incidentally was the first municipal air port to receive its official charter in Great Britain.

TRANSPORT AVROS IN AUSTRALIA.

On Jan. 1 the new air service between Sydney and Brisbane was opened by Australian National Airways Ltd., of which concern Messrs. Kingsford Smith and Ulm are the managing directors.

The machines used for this are the Avro Tens, which Messrs. Kingsford Smith and Ulm bought over here last year. Actually, four were bought, and shipped to Australia.

When these arrived and two had been erected Australian National Airways cabled for a fifth, which has since been despatched.

The introduction into Australia of a proved type, built in Great Britain and with the British Airworthiness Certificate, should do a lot to promote British aircraft sales in the Commonwealth.

ENGLAND—INDIA?

On Jan. 3, at Stag Lane, the Maharanee of Cooch-Behar performed an interesting ceremony which centred round the Gipsy-Moth *Miss India* and its pilot Mr. Man Mohan Singh, who intends to try to win the £500 prize offered by the Aga Khan for the first Indian subject who flies from England to India.

The Maharanee placed a garland on Mr. Singh and smashed a bottle of champagne on the airscrew-boss and afterwards delivered a short speech in English.

Mr. Singh is a graduate of Bristol University and learned to fly at the De Havilland School. He says that he intends to leave Croydon this week and will follow the Imperial Airways route. One fears that he may have difficulty in getting the Moth through the tunnels on that part of the route which Imperial Airways cover by rail.

The Moth, which was previously the property of the Hon. H. C. E. Bathurst, was bought by Mr. Singh from Merlyn Motors Ltd., of Bristol, agents for Malcolm Campbell Ltd. Merlyn Motors Ltd. have arranged dumps of petrol and oil along the route. Mr. Singh's machine is a standard Moth, though fitted with an auxiliary 20-gallon petrol tank, which brings the total petrol capacity of the machine up to 39 gallons. Its range is therefore approximately 740 miles.

SHELL-MEX MOTHS FOR FOREIGN SERVICE.

The order for a Gipsy Moth christened "Gavilan de Oro" from Shell-Mex Ltd. for the use of their Buenos Aires representative has been followed by further orders for Moths for their Indian and South African branches.

The gold and red Moth owned by their London Head Office and flown by Mr. H. Shaw is a familiar sight at British aerodromes, on each one of which he must have landed at one time or another in the course of his numerous business trips.

AEROPLANE BRAKES IN BELGIUM.

Bendix-Perrot Brakes, Ltd., of Birmingham, state that they are receiving many enquiries for aeroplane brakes, together with many orders from manufacturers at home and overseas. Among the latest orders is a substantial one from the Société Anonyme Belge de Constructions Aeronautiques,—better known as the Sabca. One hopes the Sabca will at the same time fit tail-wheels instead of skids, so that Sabena machines may not cut up our aerodromes when turning on one brake helped by the opposite engine.

A LIGHT AEROPLANE SPEED RECORD.

On Nov. 3 Mr. Wilfred G. Moore, flying an Inland Sport monoplane (110 h.p. Warner Scarab engine) made an average speed of 123.17 m.p.h. over an officially observed 100 km. course in the U.S.A. The machine carried the equivalent weight of a passenger as ballast, and the total weight of pilot and load was 330.5 lbs.

This is claimed to be a new World's Speed Record for light aircraft weighing less than 400 kgs. (880 lbs.), which is at present held by Mr. Alan Butler, who, with Mrs. Butler as passenger, made an average speed of 119.7 m.p.h. in a D.H. Gipsy-Moth on Dec. 7, 1928.

The Inland Sport is a two-seat high-wing monoplane made by the Inland Aviation Co. of Kansas City. The firm states that the machine used was a perfectly standard model with no special streamlining.

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In your reply please quote WF/DKB.

2nd January, 1930

The Aeroplane,
175, Piccadilly,
LONDON, W. 1.

Dear Sirs,

In reply to yours of yesterday's date we have much pleasure in informing you that as the result of our advertising in your issue of the 30th October we have received several promising enquiries for buildings for housing the small type of aeroplanes. As these enquiries emanate from such places so far apart as South Africa and the Malay States, it proves that your publication is reaching the right people abroad.

Yours faithfully,
NISSEN BUILDINGS LIMITED,

DIRECTOR.
W. FOLKES.

A GOOD BEGINNING.—Above is a reproduction of a letter from the makers of the World-famous Nissen Huts,—who now make aircraft sheds, among other types of portable buildings. It shows the result of only one half-page advertisement in "The Aeroplane."

NATIONAL FLYING SERVICES ACTIVITIES.

The members of the Hanworth Club (National Flying Services) had the opportunity, last week, of seeing M. Bleriot's film of his early flying experiments. The film, which has been described in THE AEROPLANE, is of exceptional interest and was very much appreciated by the number of members who watched it. The film was followed by the exhibition of a sensational American aviation film, the production of which type in Hollywood is all too frequent. This film was regarded by the members of the Hanworth Club and their friends in the light of comic relief.

While THE AEROPLANE is going to Press the Hanworth Club is giving a children's party. About 150 children are expected, including a party of eight which Lady Bailey is bringing. During the afternoon the children are having an hour's entertainment on the aerodrome, with joy-rides for many of them in the Club's aeroplanes. Later on there is a Christmas Tree, a cinema performance and tea and games. Obviously every right-minded child will see that in future it has a friend or relation who is a member of the Hanworth Club.

THE PROVISION OF FIREPROOF BULKHEADS.

For some time there has been uneasiness among joy-ride operators who use Avros with rotary engines because of an Air Ministry notice that such machines would not be certified as airworthy unless fitted with fireproof bulkheads behind the engine. The cost of fitting such bulkheads was said to be prohibitive, and would have put the machines out of action.

Air Ministry Notice to Aircraft Owners and Ground Engineers No. 26 of 1929 notifies the relaxation of such airworthiness requirements.

Airworthiness certificates will be granted to such machines in spite of their not having fireproof bulkheads if the machine otherwise complies with airworthiness requirements.

A rumour from Lympne says that a ground-engineer there has designed a fireproof bulkhead which can be fitted easily to 504K Avros with rotary engines. If so, owners of such machines might do well to fit it. Even though it is not yet a legal necessity it would be worth while as a safe-guard and as an advertisement for the joy-ride firms which use it.

A WARNING ABOUT SLOTS.

Air Ministry Notice No. 27 of 1929 to Aircraft Owners and Ground Engineers contains the warning that the inner ¼ in. B.S.F. bolt at the outer joint of the upper front spar of slotted Moths must be replaced by a 5/16 in. B.S.F. bolt, and that Certificates of Airworthiness for this type will not be renewed unless this modification has been made.

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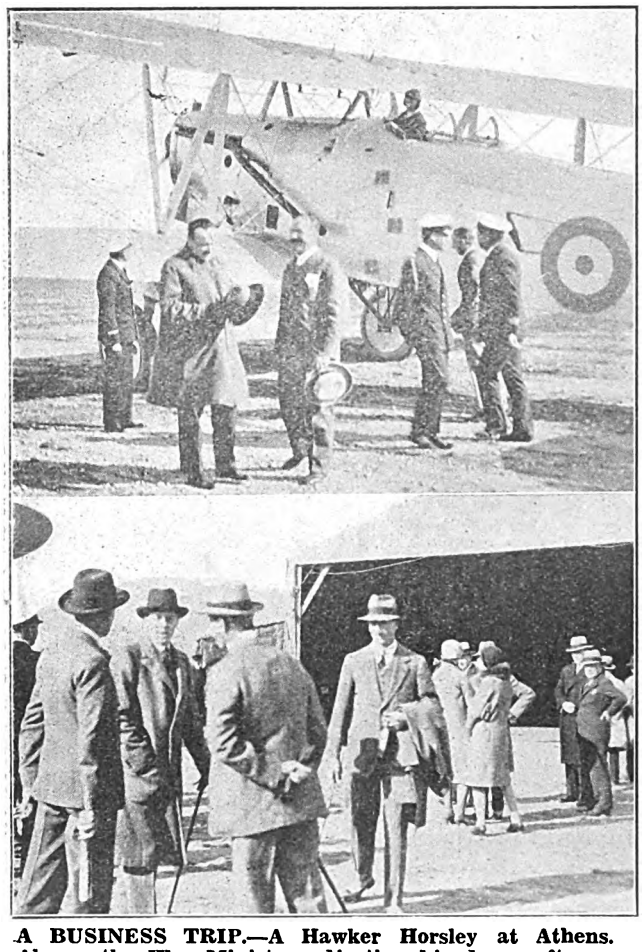

A BUSINESS TRIP.—A Hawker Horsley at Athens. Above, the War Minister adjusting his dress after a trip with Mr. Bulman. Below, Lt.-Col. Fell (on left) talking to the British Ambassador. Mr. Jones of the Hawker Co. on the extreme right.

THE WINGS OF SANTA CLAUS.

Based on, and working from, Edmonton (Canada) aeroplanes were used to carry Christmas mail to the R.C.M.P. outposts along the edge of the Arctic Zone. The arrival of these machines at the posts must have been quite as exciting as the actual arrival of Saint Nicholas in his reindeer-drawn sledge.

LONG MOTH FLIGHTS.

Recent long flights in D.H. Moths include one by Mr. J. H. Tracey, who flew from Adelaide to Brisbane,—1,150 miles in 10½ hours' flying time,—and another by Mr. Boyd Carpenter, who flew from Kano, Nigeria, to Lagos,—over 700 miles in 7 hours. This latter flight was the first made from Kano to Lagos and Mr. Boyd Carpenter is the first pilot to land on the new landing ground at Apapa.

PORTABLE HANGARS FOR LIGHT AIRCRAFT.

Following the practice of the motor trade, the De Havilland Aircraft Co. Ltd. are now in a position to sell to any owner of a Gipsy Moth a sectioned garage. This is a great advantage to those who do not happen to live within easy reach of an aerodrome where a light aeroplane with folding wings, such as the Moth, may be housed at a weekly charge of approximately £1, including the services of an engineer to assist in its removal from the lock-up, starting, etc.

A TECHNICAL SCHOOL AT STAG LANE.

Aeronautical education is a problem which is receiving the attention of the Royal Aeronautical Society, but there is interest in the fact that over a year ago this problem was foreseen by the De Havilland Aircraft Co. Ltd., who, by the appointment of an educational officer on their staff provided, in one centre at least, the opportunity for technical tuition.

Day and evening classes are held at Stag Lane. The evening classes come under the jurisdiction of the Board of Education and the Middlesex Education Committee. The lecturers who conduct the evening classes are men who actually do the work which they teach in their everyday life, in this respect differing from many teachers who, though brilliant theorists, are not practical men.

Early in December last an Examination was held at Stag Lane by Air Ministry officials at which sixteen candidates were examined for Air Ministry Ground Engineer's licences, and to all of them passes were issued.

MOTHS IN MEXICO.

Two Gipsy-Moths were first and second respectively in the first air race ever held in Mexico City on Dec. 12, 1929. The race was a 30-mile sprint, starting and finishing at Mexico City.

THE AVRO DRAWING-OFFICE DINNER.

The Drawing Office of A. V. Roe & Co. Ltd. held their annual dinner at the Grand Hotel, Manchester, on Dec. 20. Mr. R. Chadwick was in the chair.

The chairman outlined the work of the company during the year. He spoke of the amalgamation with the Armstrong-Whitworth Siddeley group, and of the enormous amount of experimental and design work that had been done, and hoped that the next year would be even more successful. This year several new types had been produced, the Avro 10, the Avro 5, and a new all-metal training machine, as well as the metallising of the Avian and the introduction of the Armstrong Siddeley Genet Major and the Hermes.

Mr. R. H. Dobson spoke highly of the new types, which had surpassed even their own hopes. He mentioned the Avro 10's which had been supplied to Australian National Airways (Messrs. Kingsford Smith and Ulm), and said that more of these machines were now on the way. Speaking of the Avro 5, Mr. Dobson referred to the successful flight of the first of these to Kenya, piloted by Mr. Campbell Black. They had just received a repeat order from Wilson Airways. Another Avro 5 was at the moment on the way to Australia.

Although the year had been spent largely in experimental work, large numbers of Avians and Avro 504N's had gone through the works for many foreign military and naval air services as well as the Royal Air Force. Concluding, Mr. Dobson felt sure that all would be as enthusiastic in the coming year, which he thought would prove one of the best.

During the evening, Mr. Chadwick proposed the health of Mr. F. B. Tompkins, who is now doing the firm's testing, and hoped that he would find his stay pleasant, until the return of Mr. Brown, who, he was glad to say, was making steady progress towards a complete recovery.

The dinner was well attended and the "Avro 5" dance band did good work.

HOW IT HAPPENED.

The following letter explains a regrettable incident, and emphasises a fact which has too often had to be discussed in this paper, namely the need for greater efficiency on the other side of the Channel:—

Sir,—Might I through the columns of your paper reply to Croydon Notes of Oct. 30, 1929?

As your issues of that period arrived in Kenya after Mr. Campbell Black had departed for England I consider in all fairness to him that as a passenger on the machine referred to, I ought to make a reply in his defence.

Having been one of the "four" able-bodied men who made up the personnel I yet fail to see why the officials at St. Inglevert should fail to spot us in, as we circled that aerodrome at a height of 1,000 feet,—the only conclusion I can draw is that the weather conditions being so bad they sat indoors not expecting a machine at all.

If holding onto the wing-tips of a large machine in a gale is considered being "In Bed," then I must say that Mr. Rowthorn and I never had a more uncomfortable hour's sleep.

In the meantime Mr. Campbell Black and Capt. Druett were endeavouring to make themselves understood over a telephone,—Heaven knows where they found it. This totally failed as neither of them was sufficiently expert at French to make the Exchange operator comprehend.

At about 11 p.m. Mr. Rowthorn and I, having obtained rope, decided to sleep in the machine, and as I am over six feet in height it can hardly be considered comfortable as the cabin at the most is only 4 feet 6 inches.

Mr. Campbell Black having failed every way of notifying Le Bourget was finally persuaded to turn in at about 1 a.m., after a day of considerably over 20 hours.

The next morning petrol was obtained. And I ask how many wayside garages in England are equipped with a telephone as Croydon suggests.—I found remarkably few, and if England hasn't got them France certainly has not.

The peasantry around Givers were extraordinarily kind, and speaking personally they gave me the *first* meal of the day. At Heston I consumed a bottle of milk at 5 a.m. and I had a cup of coffee at Croydon, where a barmaid refused my brother (the passenger who alighted) a small flask of brandy, in spite of the fact that he was violently ill. However when in doubt ask a policeman. He very soon put that right.

But why Croydon should consider it "no end of a lark" to be reported missing is beyond my comprehension. My Mother and Father, resident in Kenya, about 7,000 miles away, heard we were missing and spent three days of perfect anxiety and worry endeavouring to trace our whereabouts. This, had we been signalled in in accordance with our circling of the aerodrome at Inglevert, would naturally have been obviated.

In closing, I consider that Mr. Campbell Black, who for a matter of two years or more ferried machines over to France, certainly knows all written and unwritten rules of the air, and that Croydon authorities are under a grave misapprehension if they imagine that he omitted to carry out all the usual regulations.

Nairobi, Dec. 2. (Signed) G. DUNCAN FLETCHER.

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THE DE HAVILLAND AIRCRAFT CO. LTD.

The Annual General Meeting of the De Havilland Aircraft Co. Limited was held last week at the registered offices, Stag Lane Aerodrome, Edgware.

MR. A. S. BUTLER, the chairman, said:—

When addressing the shareholders last year, I pointed out that we were calling for £120,000, and 121,743 £1 fully-paid shares were therefore issued at par on Jan. 2 of this year, bringing the total capital up to £300,000. On April 19 a further offer of 100,000 shares was made to shareholders at 23s. a share, bringing the paid-up capital to its now present amount of £400,000, and it is interesting to note that both these issues were over-subscribed.

Not one penny has been paid as underwriting or other commission on any money subscribed for the company. Part of the proceeds of the last issue of shares has been utilised to pay off the mortgage on the company's property, which is now absolutely unencumbered. We have increased our holding in De Havilland Aircraft of Canada. We have expended over £80,000 in land, building, and plant, etc.

So far as the accounts are concerned, I would point out that the value of buildings, plant and machinery, etc., has been written down again in accordance with our usual practice, the amount thus provided being over £11,000, and the development which has taken place in this locality has considerably appreciated the value of the company's freehold land, which still stands at actual cost.

This year our business has been bigger and more profitable. We have improved our manufacturing facilities, we have extended our sales organisation in this country and abroad, and we have produced new machines for which our extended connections should provide an increasing market.

The Moth has made great strides during the last year, a large proportion of our turnover being derived from this model coupled with the Gipsy engine. Last year has seen the greatest advance yet made in private flying in this country, and in this connection we are much gratified by the excellent example that his Royal Highness the Prince of Wales has set by owning and using his own Moth.

It is gratifying to find that we are maintaining our lead in this business, as 85 per cent. of the light aeroplanes now registered as privately owned in this country are Moths.

Mr. Butler referred to the successes of the Moth in the King's Cup Race, the Siddeley Trophy Tour, the *Challenge Internationale de Tourisme*, the Zenith Cup Competition, at the International Flying Meeting at Rotterdam, in the South African Aerial Derby, in Canada and the United States, in the Australian East to West Air Race, and to the innumerable firsts, seconds, and thirds in races, landing, handling, and aerobatic competitions against all comers.

Continuing, he said,—

The production of the Gipsy engine has gone ahead in an extremely satisfactory way, and considering that the engine production shop was only really established this year, I think we can congratulate ourselves on this highly successful branch of our business. The record that one of these engines established by doing 600 hours in the air, or twice round the World in distance, untouched with the exception of general routine and maintenance, reflects great credit on its designers, Major Halford and Captain de Havilland, and is a record that we may be justly proud of, and will, I feel confident, ensure the success of this engine in the future. It is interesting to note that many other aircraft manufacturers are now considering the fitting of this engine to their types.

A licence has been granted to the Wright Aeronautical Corporation of the U.S.A. to manufacture the Gipsy engine under licence, and I am glad to be able to report that our American friends are now in a position to supply the American market with this type.

The Moth Aircraft Corporation, who are manufacturing the Moth under licence for the United States, have now joined the Curtiss-Wright group, the largest and most powerful aircraft constructors in the United States, and have got well into production during the past year, and, although the unfortunate slump in American business has given them a temporary setback, in common with all American aircraft manufacturers, they look forward confidently to a marked improvement in the spring. Certain sums have already been received as royalties from the above companies, and I feel sure we may look forward to an increase in the next year.

We now have three extremely promising new types, two of which are still undergoing trials. The first is a four-seater cabin monoplane, the Hawk Moth, which has now appeared in a form which we believe will have a great appeal to buyers in the Dominion and overseas markets. The second is a small two-three-seater cabin monoplane, which may perhaps best be described as a *de luxe* version of the Moth. The third is a military type, but, being on the secret list, I regret that I am unable to say more than that it has exceeded our expectations in every quality that counts for a military machine of that type, and I think we now really do stand a better chance of qualifying for Air Ministry contracts than ever before.

In addition, we have made developments in our engine programme, and two new types of Gipsy engine are being produced.

In July this year an International Aero Exhibition, at which we were well represented, was held at Olympia. The publicity value was undoubtedly very considerable, and will, I am confident, reflect itself in our trading during the next two years.

In the last 12 months our sales of Moths on the Continent of Europe have increased by nearly 300 per cent. I need not assure you that once we have established a market we lose no opportunity of still further extending it.

It has long been the policy of the Board to foster our Empire and oversea trade, and in this we may perhaps claim to be in the forefront of the aircraft constructors of the World. We have added to our interests in the great Dominions by this year opening a branch in India, and we are consolidating our position and adding to our prestige by offering first-class service facilities to the large number of Moths operating in that territory. We have also done considerable business in China, through agents who are strongly established.

Within the last few weeks arrangements have been concluded by which the Moth will be manufactured under licence in France and Norway.

Progress in Australia has continued steadily, and the De Havilland Aircraft Proprietary Ltd. have been able to show a satisfactory profit on last year's working. In addition to business in Moths, the chief item of interest was the supplying to West Australian Airways of four large three-engined Hercules machines for that company's service between Perth and Adelaide.

The De Havilland Aircraft of Canada Ltd. have had a very successful year. At their request Mr. Hearle, the general manager, and myself went out to advise them. In January they were turned into a public company with your company's money and Canadian money side by side. With this Canadian interest the company will be assured of most whole-hearted Canadian support. The company has built a new plant on the edge of an aerodrome which it owns just outside the city of Toronto, on a siding of the Canadian National Railways, where it will be in an excellent position.

In a report from the Canadian company the general manager states:—

"During the year the company delivered approximately 130 Moth aircraft, mostly of the metal fuselage type with Gipsy engines. A considerable proportion of these machines were seaplanes.

"In quantity, if not actually in value, the number of sales effected by the company was far in excess of any other aircraft manufacturer or distributor in the Dominion, and the year's deliveries have brought the total number of Moths in operation up to about 220, which are located from Halifax in the east to Vancouver in the west, with fairly even distribution across the country."

Further points of particular interest in this report are that they have established a series of distributors throughout the Continent to handle and service De Havilland products. The Moth has played a very important part in forest fire patrol and detection on many occasions. Much work has also been done by the Moth prospecting in the vast northern territories, and two of the most important mining discoveries made in the last year were made by prospectors using this machine.

At home our Flying School has again done excellent work, exceeding its previous year's figures in hours flown, but owing to air congestion in the vicinity of Stag Lane work has had to be turned away and increase has not been as great as in past years. Your directors are considering the purchase of another aerodrome in the vicinity which should overcome this difficulty and allow of the necessary expansion. [What about calling it Mothfield?—ED.]

An innovation during the year is the establishment of a technical school for the training of future executives and operatives in the industry. This is a considerable development of the company's former apprenticeship scheme.

The superannuation scheme instituted to encourage thrift among the staff and employees has also proved a very material success.

Your directors realise that the company has a hard and difficult time before it. The light aeroplane may now be claimed to have justified itself as a potent force in World industry and development and as a very strong factor in the promotion of civilisation and international peace. Competition may, therefore, be expected on a scale which we have not hitherto experienced, and in the struggle for the world's markets from which hitherto so much of our business has come we may find ourselves at a serious disadvantage against countries less handicapped than we by the wholly unnecessary restrictive regulations governing the construction and licensing of aircraft in this country which at present absorb much of our vital energy which should be directed elsewhere.

It was said by a former Cabinet Minister that our industry must "fly by itself," and I think that we can justly claim to have proved this statement, but unless, however, the Government can be made to realise that the only way we can continue is to fly by ourselves I am afraid that this restrictive legislation and regulation will prevent our business from developing along rational and normal lines and the Empire and foreign trade which we have so carefully and laboriously built up will be wrested from us, and our modest contribution towards the solution of the unemployment problem will be entirely lost.

Finally, it is a very pleasant duty that I have to perform in thanking most sincerely the staff and employees of the De Havilland Aircraft Company Ltd. and its subsidiary companies for their whole-hearted co-operation and support during the past year.

I now propose formally to move the adoption of the accounts and balance-sheet, as submitted, and the payment of a dividend at the rate of 10 per cent. per annum, less tax at 4s. in the pound.

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CROYDON NOTES.

During recent gales a number of aeroplanes inward bound to Croydon were obliged to land at Lympne and end their flights there. This was not on account of the gales, as reported in certain daily newspapers, notorious for their slipshod and inaccurate reports of aviation news, but because the weather was extremely bad between Lympne and Croydon.

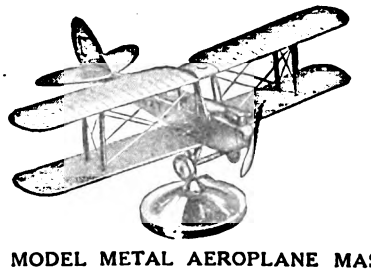
Apart from low cloud right down on the Surrey Hills, there was obviously nothing to stop these machines, which had already flown from Amsterdam, Paris, etc., across the Channel, from completing the odd fifty miles between Lympne and Croydon.

One traveller, making his first air trip, was much impressed by the steadiness of the K.L.M. Fokker in which he travelled, and obtained a thrill, though not a qualm, from observing the buffeting the Channel boats were undergoing as he flew peacefully above them. Waves were breaking right over the boats, and though the traveller did not report it, doubtless the only signs of activity on board the boats was that of large gangs of stewards working overtime with double magnum-sized basins.

Shipping in the Channel as a passenger transport is rapidly becoming obsolete of course, and the frantic excitement about the Channel Tunnel is merely a sign of the times. How long it will take, and how much it will cost to bore a hole under the Channel one dreads to think, and it all seems rather waste of time when aeroplanes cross the ditch in a few minutes.

One has no expert knowledge of drains, great or small, but experiences in frosty weather lead one to suspect the Tunnel, lest peradventure it should freeze up and burst like a large scale bath waste pipe in the first frost, owing to the stealthy activities of the great boring barnacle biting holes in it and letting the water in. It would be most distressing, too, if it got bunged up any time like a pipe stem and had to be cleared with a fabulous feather from the tail of a roc, and on the whole one cannot help thinking the public would be better advised to fly than to entrust themselves to such new-fangled notions.

Incidentally, flying quite frequently has the advantage over other forms of transport, not only during rough weather, when the aeroplane, having only one element to contend with instead of two, naturally shakes people's livers and things up less than a boat, but also on occasions when there is thick fog which deranges land and sea transport, but above which the aeroplane, in company with the lark and the bumble bee, can soar unfettered in blue sky and sunshine.—SPRY.



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ANALYSIS OF FIGURES FOR PAST WEEK.

Trips per Day.—Sunday, 0; Monday, 11; Tuesday, 22; Wednesday, 6; Thursday, 15; Friday, 14; Saturday, 19.

IMPERIAL AIRWAYS LTD.:
London—Egypt—India: London—Le Touquet—Paris—Basle—Zurich: London—Ostend—Brussels—Cologne and return: Machines 31, passengers 164, freight 9¼ tons. India Route: Inward, passengers 0, mail 0 lbs.; outward: passengers 0, mail 864 lbs.

AIR UNION:
Paris—London: Machines 22, passengers 72, freight 5¼ tons.

K.L.M.:
Amsterdam—Rotterdam—London: Machines 9, passengers 15, freight 4¼ tons.

SABENA:
Brussels—London: Machines 10, passengers 15, freight 1¾ tons.

DEUTSCHE LUFT HANSA A.G.:
Amsterdam—London: Machines 11, passengers 11, freight 1¾ tons.

MISCELLANEOUS:
British machines 4, passengers 4.
Foreign machines 0, passengers 0.
Total number of trips by British machines, 35, carrying 168 passengers. Foreign machines, 52, carrying 113 passengers.

COMPARATIVE FIGURES.

Week ending Jan. 4:
Machines, 87; Passengers, 281; Crews, 236; Total personnel, 517.
Corresponding week, 1929:
Machines, 89; Passengers, 263; Crews, 178; Total personnel, 441.
Corresponding week, 1928:
Machines, 59; Passengers, 200; Crews, 104; Total personnel, 304.
Corresponding week, 1927:
Machines, 41; Passengers, 131; Crews, 67; Total personnel, 198.
Corresponding week, 1926:
Machines, 53; Passengers, 120; Crews, 65; Total personnel, 185.
Corresponding week, 1925:
Machines, 63; Passengers, 70; Crews, 79; Total personnel, 149.
Corresponding week, 1924:
Machines, 38; Passengers, 51; Crews, 58; Total personnel, 109.
Corresponding week, 1923:
Machines, 34; Passengers, 63; Crews, 65; Total personnel, 128.
Corresponding week, 1922:
Machines, 31; Passengers, 51; Crews, 50; Total personnel, 101.
Corresponding week, 1921:
Machines, 27; Passengers, 30; Crews, 32; Total personnel, 62.

RECEIVERSHIPS (APPOINTMENT OR RELEASE).

AEROPLANE SERVICES LTD.—P. Pettifer, of Yardley Road, Acock Green, Birmingham, was appointed Receiver on Dec. 6, under powers contained in debentures dated April 5, 1929.

PERSONAL NOTICES.

DEATH.

GROSVENOR.—On Jan. 7, at Hobson's Bay, Melbourne, Australia, as the result of a flying accident, Hugh Raufe Grosvenor, son of Lord Stalbridge, aged 25.

The Hon. Hugh Grosvenor was a Lieutenant in the 7th Hussars (Supplementary Reserve of Officers). In 1928 he was appointed A.D.C. to the Governor of South Australia. He learned to fly with the Hampshire Aeroplane Club. Soon after his arrival in Australia he bought a D.H. Moth in which he flew from Sydney to Adelaide in record time. In May and June of 1929 he flew round Australia, a distance of 8,000 miles, in 31 days. He also took part in the search by air for Flt. Lt. Moir and Flg. Off. Owen when they were missing in Australia on their flight from England.

MARRIAGE.

SADLER—MANNERS.—On Jan. 4, at All Souls', Langham Place, John Archer (Sq. Ldr., R.A.F.), son of Geoffrey Edward Sadler, of Abbots Langley, Herts, to Rebecca, daughter of Mrs. T. N. Manners, of Penzance, Cornwall.

FORTHCOMING MARRIAGE.

HUNT—TUBBS.—The engagement is announced between Alfred William Hunt, R.A.F., only son of Mr. A. J. Hunt and the late Mrs. Hunt, of Melbourne, Australia, and Mary Isobel, daughter of Mr. and Mrs. F. E. Tubbs, of 4, Westwood Road, Southampton.

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Special PREPAID Rate—18 words 4/6, 3d. per word after; 13 insertions, 18 words, 4/-; 26 insertions, 18 words, 3/6; 52 insertions, 18 words, 3/-, 2d. per word after. Situations Wanted ONLY—18 words 1/-.

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AIRCRAFT FOR SALE.

Brooklands School of Flying Ltd., Brooklands Aerodrome, Byfleet, Surrey. Second-hand Moths with certificates of airworthiness, excellent condition, from £350. Hire purchase and part exchanges. Telephones Byfleet 436 and 437.

D. W. Aircraft Co., Brooklands Aerodrome; have for sale several S.E.5as, reasonable figure, new condition with C. of A. Telephone, Byfleet 331.

National Flying Services Ltd. (See page 57). Quick deliveries. New or second-hand machines.

Phillips and Powis Aircraft (Reading) Ltd.—Authorised Moth Agents. Immediate delivery. Unique hire-purchase terms offered. Exchange specialists.—Reading Aerodrome. Sonning 114.

FOR SALE.

Avro 504K Spares. New Main Planes; Cowlings; Undercarriages; Skids; Tanks, etc. Send for separate list. Coley Ltd., Queen Elizabeth Road, Kingston-on-Thames. 'Phone 0365.

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R.A.F. Full Dress Uniform, perfect condition, 5 ft. 11 in., 39 in. chest, complete in case, accept £20. Box No. 5754, THE AEROPLANE, Cannon House, Pilgrim Street, E.C.4.

AIR SURVEY.

Air Survey Co. Ltd., 3, Grosvenor Gardens, S.W.1. (Victoria 5903.) Dum Dum, Calcutta, and Monkey Point, Rangoon.

The Aircraft Operating Co. Ltd., 8, New Square, Lincoln's Inn, London (Holborn 8131), and Bulawayo, Southern Rhodesia; Cairo, Egypt; Rio de Janeiro, South America: Contractors to the Ordnance Survey. Laboratories and Subsidiary Company for aerial photography in the British Isles. Aerofilms Ltd., Colindale Avenue, Hendon (Colindale 6183 and 6184).

AIRCRAFT INSTRUMENTS.

Aeroplane Wheels, New. Fitted with Dominion 26 x 2½ heavy tread tyres, and new tubes. Pair, complete with axle and bushes, 70s. carriage forward; Windscreen Frames and Brackets, without glass 2s.; K.L.G. Plugs, F.9 new, 9s. 9d. doz. Revolution Indicators, Smith's, 600-2,600 r.p.m. with 3 ft. drive, 22s. 6d.; Above postage paid. Send for free list. Coley Ltd., Ordnance Works, Queen Elizabeth Road, Kingston-on-Thames. 'Phone 0365.

MISCELLANEOUS.

Petrolmotor Castings, partly machined, ½ horse (9s. 9d. per set). Catalogue 3d. Madison's Works, Wade Street, Littleover, Derby.

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The Brooklands School of Flying Ltd., having established new workshops, is in a position to carry out repairs and overhauls for C. of A. in the shortest possible time at competitive prices.—Phone, Byfleet 436 and 437.

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National Flying Services Ltd. (See page 57). Go by N.F.S. 1s. a mile; 1s. 6d. two passengers.

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S. LEWIS'S.—The Old Firm of Flying-Racing and Motor Clothing Fame, 19 and 27, Carburton Street, London, W.1. We wish our Thousands of Customers to know we have no connection with any other Firm. Flying Helmets, best Quality, Fur trimmed, 14s. 6d., 12s. 6d.; All Leather Lined Chamois, 10s. 6d., 12s. 6d.; Flat Type Phones, 5s.; Metallic Tubing and Rubber Connection, 2s. 6d.; Y Piece and Adapter combined, 3s. 3d.; White Flying Suits, 25s. 6d.; Ditto, with Lightning Fasteners, 35s.; White Combination Suits, 14s. 6d.; White Flying Helmet, 6s. 6d.; Featherweight type Goggles, fitted genuine Triplex Lenses, slightly tinted, new W.D., 7s.; Ditto, fitted genuine clear Triplex Lenses, 11s.; Aviation Mask Goggles, fitted genuine Tinted Triplex Lenses, 14s. 6d.; Ditto, fitted Tinted Triplex, 12s. 6d.; Meyrowitz Luxor Goggles, fitted Triplex unsplinterable lenses, 40s.; R.A.F. Scarf, 5s. 6d.; Pilot's Gauntlets, 12s. 6d. per pair; Suede Golf Jacket, best quality, ideal for flying, 50s. We are contractors to Foreign and Colonial Governments. S. Lewis's, 19 and 27, Carburton Street, London, W.1.

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THE AEROPLANE

6d. Weekly.

INCORPORATING AERONAUTICAL ENGINEERING

Edited by C.G.Grey

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and by putting machines through tests at Martlesham or Felixstowe, or by getting parts and accessories and fittings passed at Farnborough. Time is money now, more than ever before, if we are to meet and beat foreign competition.

Now let us turn out attention to our engines of 1929.

AERO ENGINES.

A.B.C. Motors Ltd.

A.B.C. Motors Ltd. are the direct successors of one of the first two firms in this country to set to work seriously to produce air-cooled radial engines. At the end of the War 1914-18 the A.B.C. Dragonfly engine was one of the highest-powered engines in the World for its weight.

Unfortunately the whole art of making high-powered air-cooled engines was so young in those days that the Dragonfly was not fit for continuous use. Nevertheless its light weight gave it such an advantage for single-seat fighting machines that Lord Weir, who was then Secretary of State for Air, ordered that these engines should be produced in thousands, quite on the understanding that after every patrol of about three hours in a fighting machine, each engine would have to be changed and overhauled before it could be used again. It was a heroic remedy for our troubles of the time, but it would certainly have worked.

Unfortunately, from the point of view of the A.B.C. Company of that time, the War stopped before their big engines were developed to what would now be considered a proper state of airworthiness. All orders for war-material were cut off and there was practically no market for an engine of that power. Consequently the firm turned its attention to making motor-cycle engines and made them very well. It only returned to the production of aero-engines about 1923, and it then produced a small two-cylinder double-opposed horizontal engine called the Scorpion. This duly passed the Air Ministry's type-test and was used quite considerably in the light aeroplane competitions of 1923 and 1924 and thereabout.

The market for very small aero-engines of between 25 and 35 h.p. has always been, and must necessarily be, comparatively small. But the little Scorpion engine had its fair share of what business there was to be done.

In 1928 Mr. P. A. Dennis, the Managing Director of the firm, started to produce an engine of higher horse power. The result, when it appeared in 1929, was the A.B.C. Hornet 80 h.p. engine. This has four cylinders, arranged horizontally, two on each side, opposed to one another. That is to say, it is in its lay-out two Scorpions side-by-side, or rather end-to-end.

It has proved itself during 1929 to be a very useful and reliable power-plant. So far it has only been used in small experimental light aeroplanes such as the Southern Martlet, and the Civilian Coupé. But it obviously has great possibilities for a small twin-engined machine in which a couple of these could easily be built into the leading edges of the wings. The builder would then have a neat twin-engined machine of a full 160 h.p. And with the engines tucked into the wings there ought to be less head-resistance than is offered by either radial or vertical engines in this type of machine.

What the plans of the A.B.C. Company may be for the future, one cannot guess. But one feels that an 8-cylinder double-opposed horizontal engine of the Hornet type, or even a twelve cylinder, ought to have possibilities. In any case Mr. Dennis must be given full credit for having introduced to British Aviation a type of engine which has possibilities and does not exist in any other country.

A.D.C. Aircraft Ltd.

A.D.C. Aircraft Ltd. have already been mentioned in the Aircraft section of this series of articles as the successors of The Aircraft Disposals Company. As the work of the old Disposals Company included the selling of all types of aero-engines, naturally A.D.C. Aircraft Ltd. when they started re-building aeroplanes till they practically became new machines, also started re-building and improving engines. The first engine which they produced was the Cirrus, which is now produced by Cirrus Aero-Engines Ltd. It is now one of the most famous aero-engines of the world, and will be duly dealt with in its own section.

Some time after the first Cirrus, the A.D.C. Aircraft Ltd. produced an engine called the Nimbus. This is a 300-330 h.p. six-cylinder water-cooled engine, built up partly of part of the Siddeley Puma engine and partly of brand new parts designed to raise the power of that excellent war-time engine. The Nimbus has had considerable success. It gives nearly a 100 h.p. more than the original Puma, and it has been bought by various foreign nations.

The most interesting product of A.D.C. Aircraft Ltd. in 1929 was the new 300 h.p. A.D.C. Airsix, a six-cylinder in-line air-cooled engine. This is, as it were, a cross between the Cirrus and the Nimbus. The crankcase and everything below the cylinders is distinctly of the Siddeley Puma type, and the six big air-cooled cylinders are equally very much of the Cirrus type. So far it has not been asked to put up any remarkable performances, but it has done good test-runs and is obviously reliable.

Armstrong Siddeley Motors Ltd.

Here we have one of the most remarkable engineering achievements in the Aircraft Industry. During the War 1914-18, Siddeley-Deasy Motors Ltd., who hitherto had been makers of motor-cars, were asked to take over the B.H.P. (Beardmore-Halford-Pullinger) engine, which was being produced by the Arroll-Johnston firm for Beardmore's, of Glasgow, and to produce it in quantities.

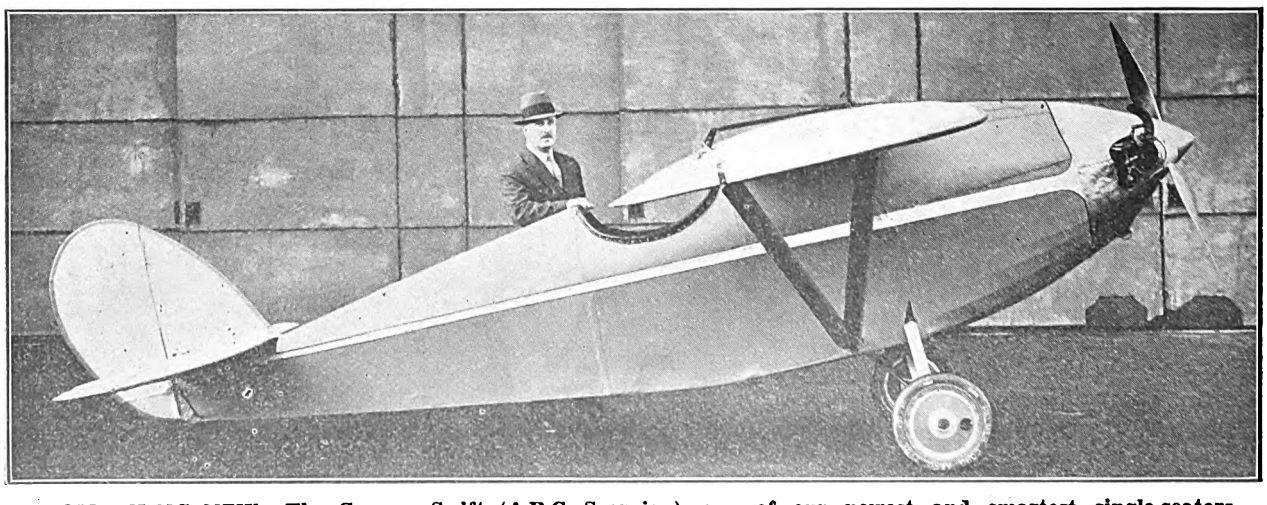
The Siddeley-Deasy engineers proceeded to modify the engine and it became in due course the Siddeley Puma, which was one of the most notable aero-engines of the War.

During the War, also, the firm which had grown from being an important motor-car firm into an enormous war material factory, set to work to produce a radial air-cooled engine.

This duly appeared as the Siddeley Jaguar. It was a 14-cylinder engine of, at that time, approximately 300 h.p. Its development was due, in the first place, to Major F. M. Green, formerly of the Royal Aircraft Factory at Farnborough, and to Mr. Viale, a Franco-Italian engineer, who had built radial air-cooled engines in the very earliest days of flying, long before the War.

The result of producing the Jaguar engine has been an immense amount of trade all over the World with foreign countries. Not only have British aircraft with Jaguar engines been sold to nearly all foreign nations which profess to have an air force of any size, but Jaguar engines have been sold in large quantities to foreign manufacturers of aircraft in countries where they build aeroplanes but have not until recently built air-cooled engines. In this way, Armstrong Siddeley Motors Limited, as the firm is now called, have contributed enormously towards British exports —which after all are what we all have to live on.

The modern Jaguar engine is made in a great variety of types. The most powerful of all is the Jaguar Major of the S type. This, with the supercharger in full blast, delivers 545 h.p.—but the supercharger is not supposed to be used at less than three thousand feet. There are three types of this engine according to the kind of supercharger which is used with each. Below this in power is the ordinary Standard Jaguar with slightly smaller cylinders. This engine ranges in power from the normal 400 h.p. of the ungeared type up to 480 h.p. for the geared type,—though



SOMETHING NEW.—The Comper Swift (A.B.C. Scorpion), one of our newest and smartest single-seaters, —described in full on pages 96, 98, and 100.

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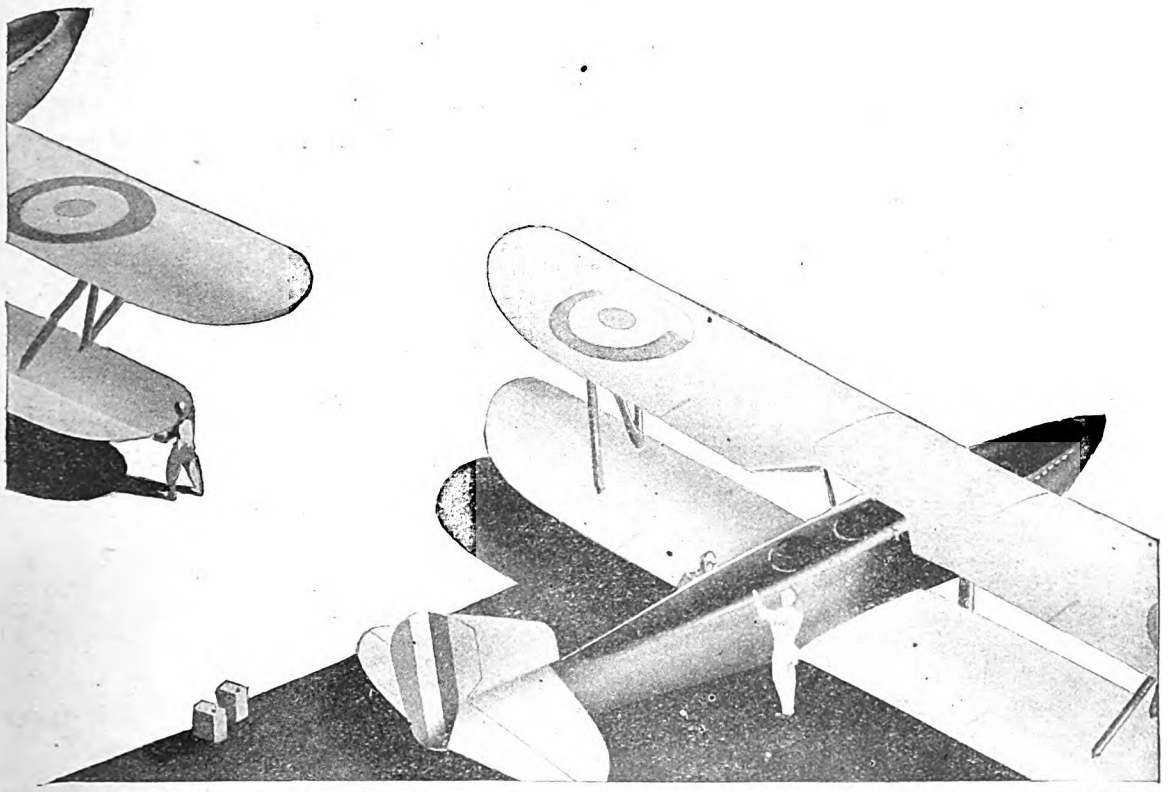
AIRCRAFT



THE FAIREY AVIATION COMPANY · LIMITED · HAYES · MIDDLESEX

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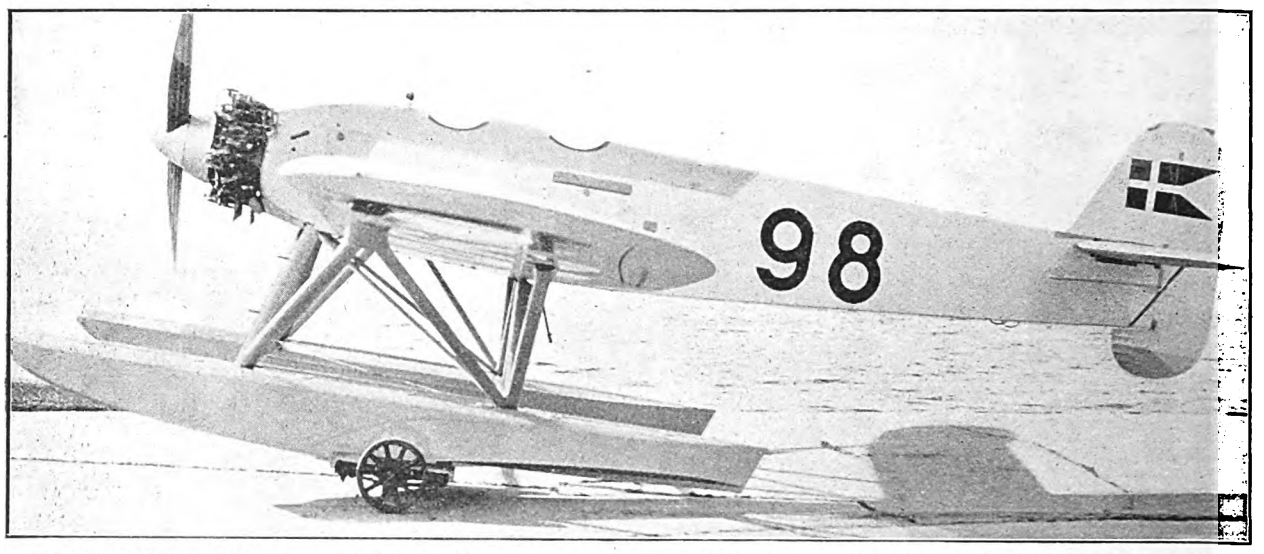


JAGUAR-ENGINED.—A Danish-built Heinkel monoplane fitted with an Armstrong Siddeley geared Jupiter engine. A contribution to our overseas trade.

this type at maximum revolutions per minute will deliver 510 h.p.

As the Jaguar engine can be had geared or ungeared, supercharged or not supercharged, the reader may see that there is plenty of variety of choice. And in all varieties the Jaguar has given excellent service during the past year.

Though the Jaguar is not in any way a new engine of 1929, it has made such remarkable progress all over the World, and it has been so much improved in detail, with consequent improvements in efficiency and increased horse-power, that 1929 may certainly be set down as the great year for the Jaguar engine.

Another of the Armstrong Siddeley engines which deserves notice, though as yet it has no outstanding performance to its credit, is the Leopard. This is a 14-cylinder air-cooled radial engine of 700-750 h.p. It differs chiefly from the Jaguar engine, apart from its larger size, in having four valves per cylinder instead of two. The Leopard has been used very successfully in the Hawker Horsley bomber and in a big torpedo seaplane built by the Heinkel firm. It has only come to the fore in 1929, and we may look forward to high performances by it before long.

Next to the Jaguar in decreased size is the Armstrong Siddeley Lynx. This has been quite one of the most successful engines of 1929. A year or two ago the Lynx was adopted as the standard training engine for the R.A.F. in the Avro 504 biplane. Since then it has been used in a variety of aeroplanes all over the world.

Its most notable success has been in the three-engined Fokker monoplane in which the Netherlands Government have been running trial mail-services between Holland and Netherlands East Indies. On these voyages the Lynx engines have given complete satisfaction. In fact, although one is in close touch with correspondents in the Netherlands East Indies and Burma and in India, from whom one has heard a good deal about the voyages of these machines, one has never heard a word of complaint about the performance of the Lynx engine.

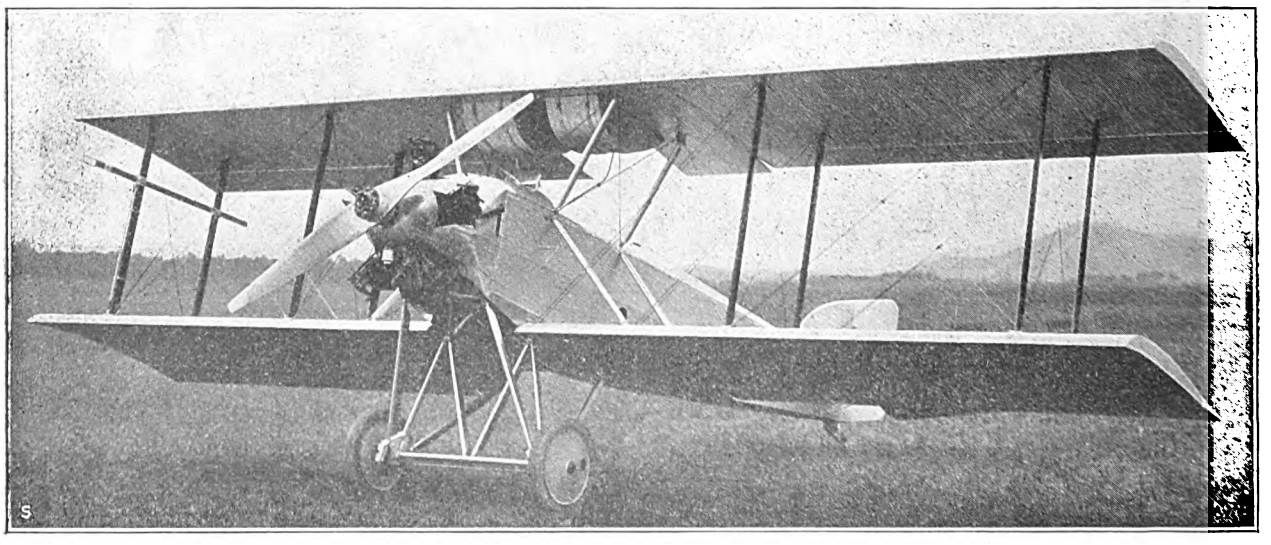
The Lynx was, in fact, the first British engine of the radial air-cooled type put up successful long-distance performances in competition with what looked at one time like being the all-conquering Wright Whirlwind. To-day the Lynx is regarded as being quite in the front rank of the World's engine of the 200 h.p. class.

Naturally the performances of the Lynx Major, which is the 1929 development of the original Lynx, will be watched with particular interest. It gives 280 h.p., at its maximum r.p.m. And the ordinary standard Lynx with a geared air-screw gives 235 h.p. at the maximum r.p.m.

Below the Lynx again in power comes the Mongoose. This is a five-cylinder radial air-cooled. Actually the cylinders are of exactly the same type and size as those of the Jaguar and the Lynx. That is to say any cylinder can be used as a replacement for any other in any of these engines. This naturally makes not only for cheapness of production but also for reliability, and perfection in manufacture,—because the men and the machines are constantly working on the same type of cylinder, valves, valve-gear and so forth, and are not constantly being changed about from one type of work to another.

Also, naturally, this standardisation of parts makes the Siddeley range of engines highly desirable for any firm which is operating a commercial service. It may have air liners of the largest size with several Jaguars in each, or it may have single-engined high-speed postal or freight-carrying machines, or it may have smaller passenger machines with two or three Lynxes, or it may have high-speed touring aircraft with single Lynx engines, or it may have training machines or small air-taxis with Mongooses, and for all of these different types of machines, only one class of spare need be kept. Any one cylinder, any one valve, or any one component concerned with the cylinder can be used for any replacement.

To return to the Mongoose, this egine gives 150 h.p. at normal revolutions, and 165 h.p. at maximum revolutions, per minute. It has been used during 1929 with remarkable



MONGOOSE-ENGINED.—A Japanese Mitsubishi two-seat primary training biplane fitted with a Japanese-built Armstrong Siddeley Mongoose engine. A contribution to our overseas trade.

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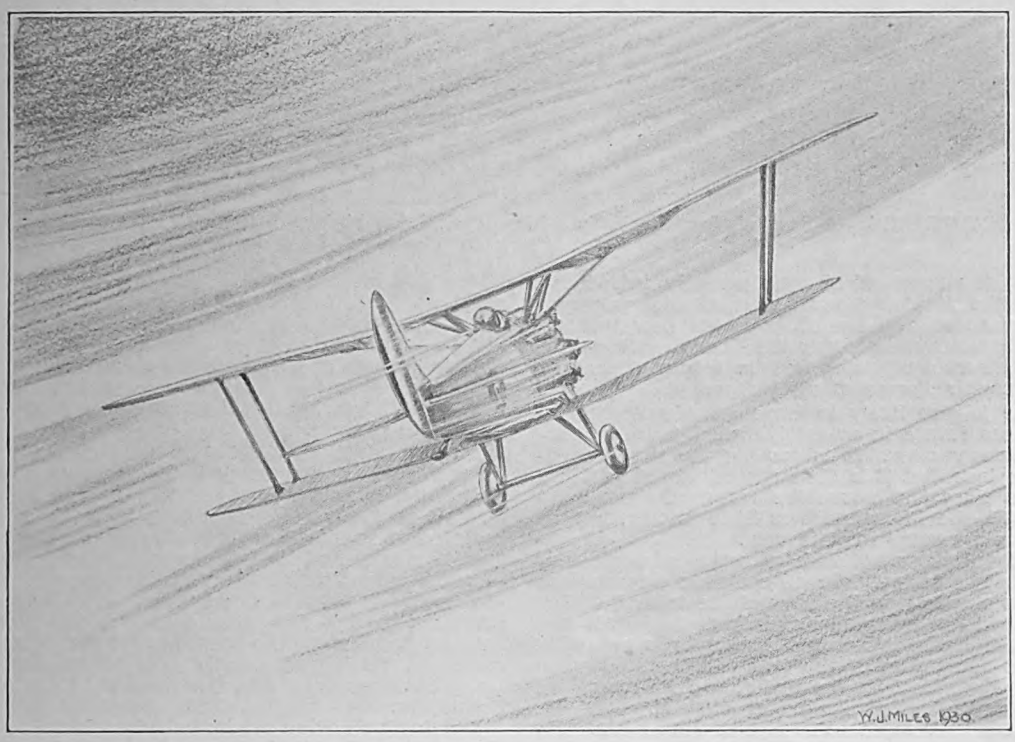
"Bristol"



THE

"Bristol"

BULLDOG.

ALL METAL, SINGLE SEATER, DAY AND NIGHT FIGHTER

fitted with either

THE "BRISTOL" JUPITER SERIES VII F OR SERIES VI F ENGINE.

Adopted as standard equipment in the Royal Air Force and the Royal Australian Air Force.

Designed and Manufactured by:

THE BRISTOL AEROPLANE CO., LTD., FILTON, BRISTOL.

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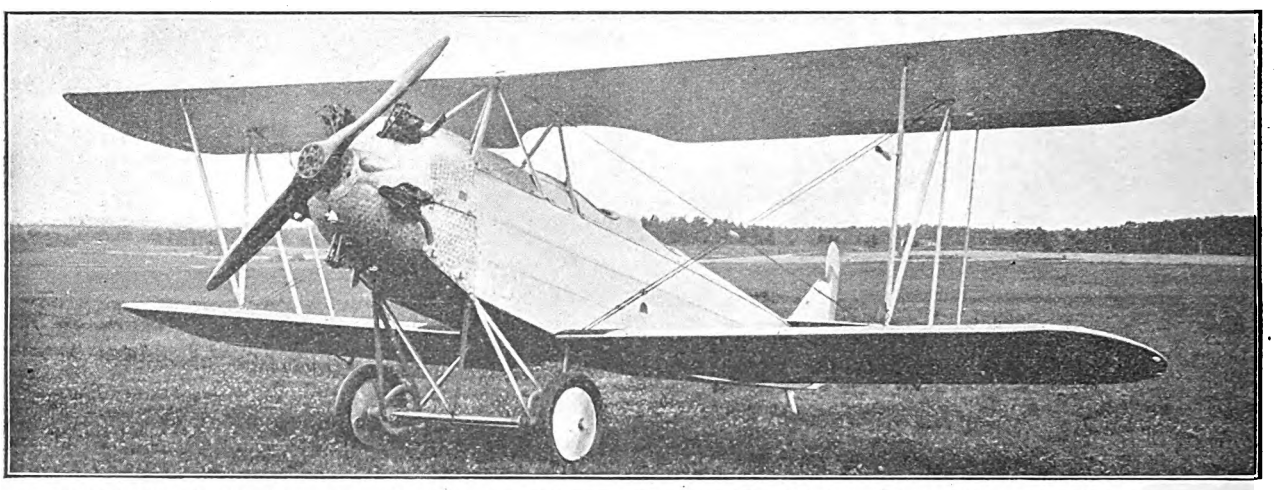


MONGOOSE-ENGINED.—A Swedish Svenska Falken two-seat training biplane fitted with an Armstrong Siddeley Mongoose engine. It can also take a Lynx engine of the same make.

success in two new types of aircraft recently introduced. One of them is the Hawker Tomtit, a small high-performance training machine, and the other is the new training Avro, which is in the same class as the Tomtit and may be regarded as its direct competitor for the favour of the Air Ministry and the Air Forces of all Nations.

The Mongoose is also likely to have considerable popularity in the near future in privately-owned touring aeroplanes of the luxury class. It is too big for the conventional light aeroplane, but it is distinctly indicated as being suitable for the class just above the standard light aeroplane. Until 1929 the Mongoose was little known, but in 1929 it has certainly come into its own.

The last of the Armstrong Siddeley series of engines is the Genet. This is a five-cylinder air-cooled engine, and its general design is precisely on the lines of the other Siddeley series. It differs in having smaller cylinders. In fact it was actually the first radial air-cooled engine built expressly for use in light aeroplanes of the size which would come within the range specified by the *Fédération Aéronautique Internationale* for Light Aeroplane competitions.

The original Genet is rated at 80 h.p. at 2,200 r.p.m. Its actual horse-power is about 82 and its maximum is 88.

During 1929 a more powerful version was introduced known as the Genet Major. In appearance it is almost exactly like the ordinary Genet. In fact one would have to be an expert to identify one from the other in photographs. For a small engine it is exceedingly light as it only weighs 2.08 lbs. per h.p.

The fact must be remembered that a small engine always weighs more for its horse-power than a big engine, simply because there are so many fittings which are of the same size and the same weight in a big engine as they are in a little one. For example a magneto on a small engine is practically of the same size as a magneto on a big engine, and so weighs considerably more in proportion to the h.p. its engine delivers.

The Genet Major gives 103 h.p. normally and at its maximum r.p.m. delivers 110 h.p.

Thus we see that the Armstrong Siddeley range of engines covers everything from the normal light aeroplane right up to the biggest type of aeroplane which has yet been designed. And owing to the standardisation of parts, they offer a particularly attractive proposition to air line operators and to foreign governments, which, coupled with the high reputation of these engines for reliability, accounts for the large amount of foreign business which has been done with them so far, and will undoubtedly produce more business in the future.

The Bristol Aeroplane Co. Ltd.

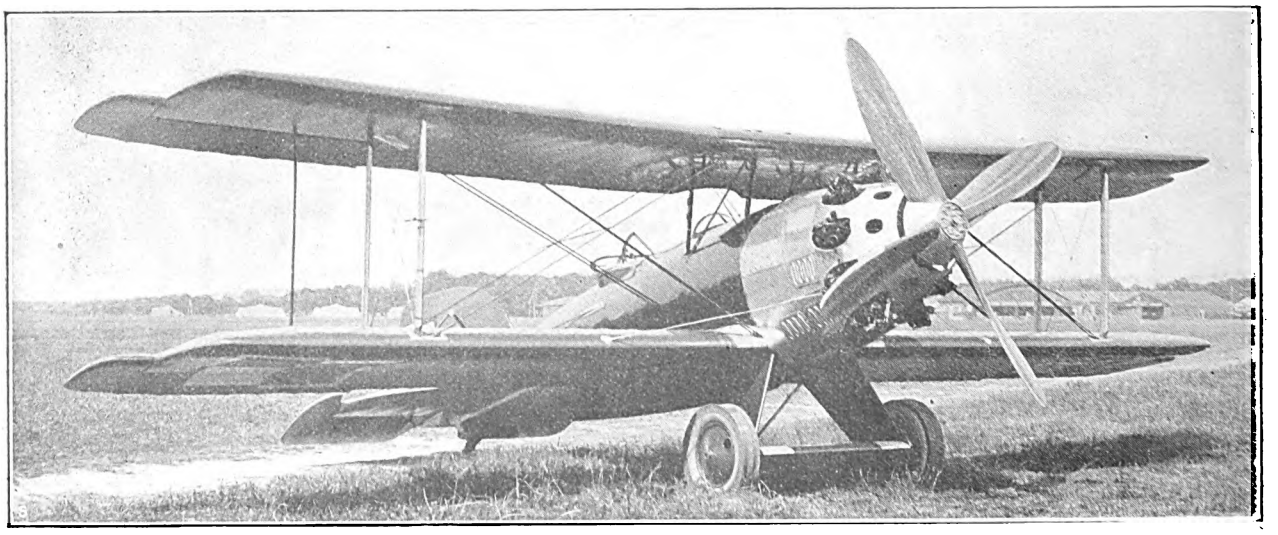
By a curious combination of circumstances the Bristol Aeroplane Company now combine in one firm the earliest aircraft company formed as such in England and the first radial aero engine firm formed as such. To-day the Bristol Jupiter engine and its less powerful brother, the Titan, and to some extent its smaller but more powerful brother, the Mercury, are manufactured under licence in more foreign countries than is any other engine in the World.

Apart from engines which are manufactured in foreign countries, the Bristol Jupiter does an enormous amount of foreign business, and has also done big trade in the British Dominions.

The Jupiter engine originated when Mr. Roy Fedden was, during the War 1914-18, working with Brazil-Straker, an important firm of motor-car manufacturers. This firm began to produce a range of radial air-cooled engines called the Cosmos, and from these the Cosmos Aero Engine Co. was formed. The most likely engine of the Cosmos series was the Jupiter, which in those days was supposed to give about 250 h.p.

The end of the War came before the Cosmos Jupiter had been perfected to the same state of reliability as were a number of water-cooled engines. With that foresight which has been the outstanding characteristic of the Bristol Aeroplane Co. Ltd. ever since the late Sir George White founded it in 1910, the Directors of the Bristol Company took over what looked like the remains of the Cosmos Co. But in fact the real asset of the Cosmos firm was the brains and experience and indomitable energy of Mr. Roy Fedden.

When he found himself established in properly equipped modern works and backed by the finances of the Bristol Company, Mr. Fedden was not long in producing a



JUPITER-ENGINED.—A Polish W.Z.10 two-seat reconnaissance biplane with a French-built geared Jupiter.

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PROOF

Words only do not convince.

PERFORMANCE

constitutes the final test of quality.

Extract from "The Times" "Review of the Year," 1st Jan., 1930 :

"Lady Bailey completed in January a remarkable air tour of some 18,000 miles from England to Cape Town and back by the West Coast route."

Lady Bailey flew a CIRRUS engined Moth.

Extract from a letter from a South African engineer, 18th Dec., 1929 :

"Probably the greatest test an engine ever passed through was Squadron Leader Hinkler's 15½ days' flight from England to Australia."

Squadron Leader Hinkler flew a CIRRUS engined Avian.

Extract from a letter from Mr. J. E. Carberry, 24th Aug., 1929 :

"With reference to my participation in the Challenge de Tourisme Internationale with my CIRRUS HERMES engined machine, and in which I was successful in returning the fastest time over the course of approximately 4,000 miles round Europe, I wish to take this early opportunity of congratulating you upon the remarkably efficient running that was given by the engine throughout the race.

Mr. Carberry flew a HERMES engined R.K.25.

Extract from a letter from Lieut. R. R. Bentley, 27th Aug., 1929 :

"On completion of the second round trip : London—South Africa—London, I have nothing but praise to offer for CIRRUS Engine No. 85 Mod/III, which has thus completed, with the utmost reliability, an air mileage of something over 50,000."

Lieut. Bentley flew a CIRRUS engined Moth.

CIRRUS AERO ENGINES, Ltd.,

Regent House,

Telephone: HOLBORN 4.76. **89, KINGSWAY, LONDON, W.C.2.** Telegrams: OCIRRUSO, LONDON.

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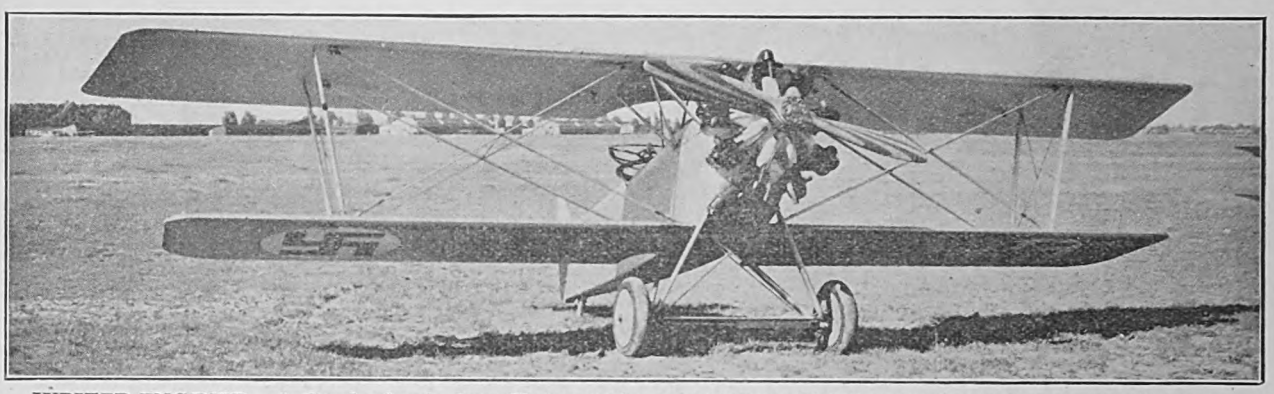


JUPITER-ENGINED.—A Czechoslovak Aero 32 two-seat reconnaissance biplane supplied to the Finnish Government and fitted with a French-built Jupiter engine.

thoroughly satisfactory radial air-cooled engine. And since then the Jupiter engine has been one of the best advertisements in the World for the high quality of British workmanship, material and design.

At the present moment the Jupiter engines are being built under licence in Canada, France, Italy, Germany, Belgium, Czechoslovakia, Jugoslavia, Portugal, Switzerland, Hungary, Spain, Poland, Japan, and the United States.

The first country to take out a licence to build Jupiter engines was France, where the famous Gnome-Le Rhone Company arranged to build this type. The result has been that some of the World's greatest flights have been made either with Jupiter engines or with Gnome-Rhone Jupiter engines. Moreover, the French Army and the French Navy have adopted the Jupiter built by the Gnome-Rhone firm as practically their standard engine for all big bombers. Also, to-day the Jupiter is used equally in the big bombers of the Royal Air Force and in the high-speed fighters.

Though the Jupiter engine has preserved its original scheme of nine air-cooled cylinders, it is made in seven different up-to-date types, all of which have been developed to their present high stage of efficiency in 1929.

They start with what is known as the series VI FH. This is the standard Service engine and gives 420 h.p. at normal revolutions of 1,700 per minute.

The series VI FM, which has higher compression, gives 500 h.p. at maximum revolution.

The Series VI FL, which is a commercial engine, has lower compression and gives 480 h.p.

After that comes the supercharged series. The standard VII F engine of this type gives its maximum horse-power of 520 at a height of 10,000 ft.

Then comes the geared series VIII F, which in its normal state gives 460 h.p.

Then there is the series IX F geared engine, which gives 545 h.p. at maximum revolution.

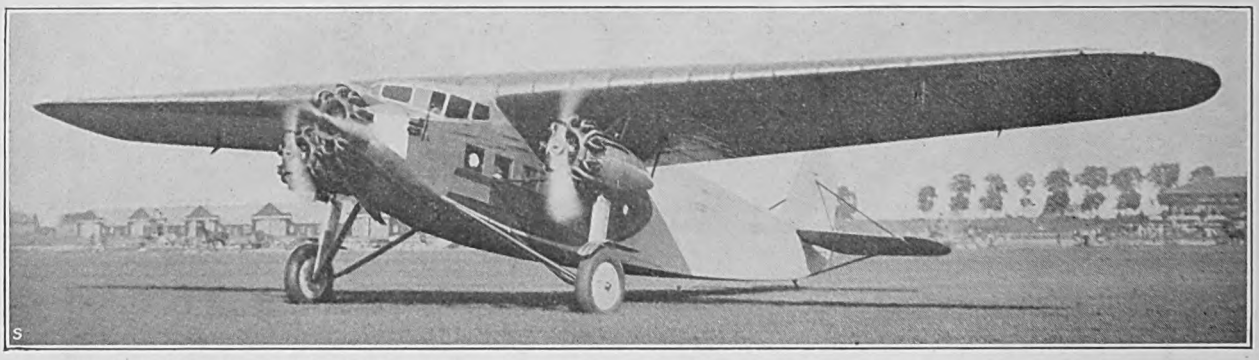
And lastly there is the series XI F which is a geared commercial engine, and gives 525 h.p. at maximum revolutions.

An engine which has been recently introduced is the Bristol Neptune, a seven-cylinder radial, otherwise precisely on Jupiter lines, which gives 350 h.p. at maximum revolutions.

Below this again is the Bristol Titan, a five-cylinder engine, also otherwise on Jupiter lines, which gives a maximum of 220 h.p. With French-built Titan engines some very fine voyages have been made between Holland and the Netherlands East Indies in three-engined Fokker monoplanes.

The Bristol Mercury, to which reference has been made, is an engine with cylinders of bigger bore but shorter stroke than those in the Jupiter, so that it gives more power for smaller over-all diameter. In it special light alloys, probably magnesium, are used. And it has various other special features which account for its being kept on the Secret List by the Air Ministry.

Altogether, as may be seen, Bristol aero-engines, more especially the Jupiter, have contributed largely to the prestige of British Aviation all over the World. By exporting so many, by having them built in so many different countries, all of which regard England as being their source of



JUPITER-ENGINED.—The latest Fokker commercial monoplane fitted with three French-built Bristol Jupiters.

JUPITER-ENGINED.—The Fokker F-XI commercial monoplane supplied to a Hungarian air transport company and fitted with a French-built Bristol Jupiter engine.

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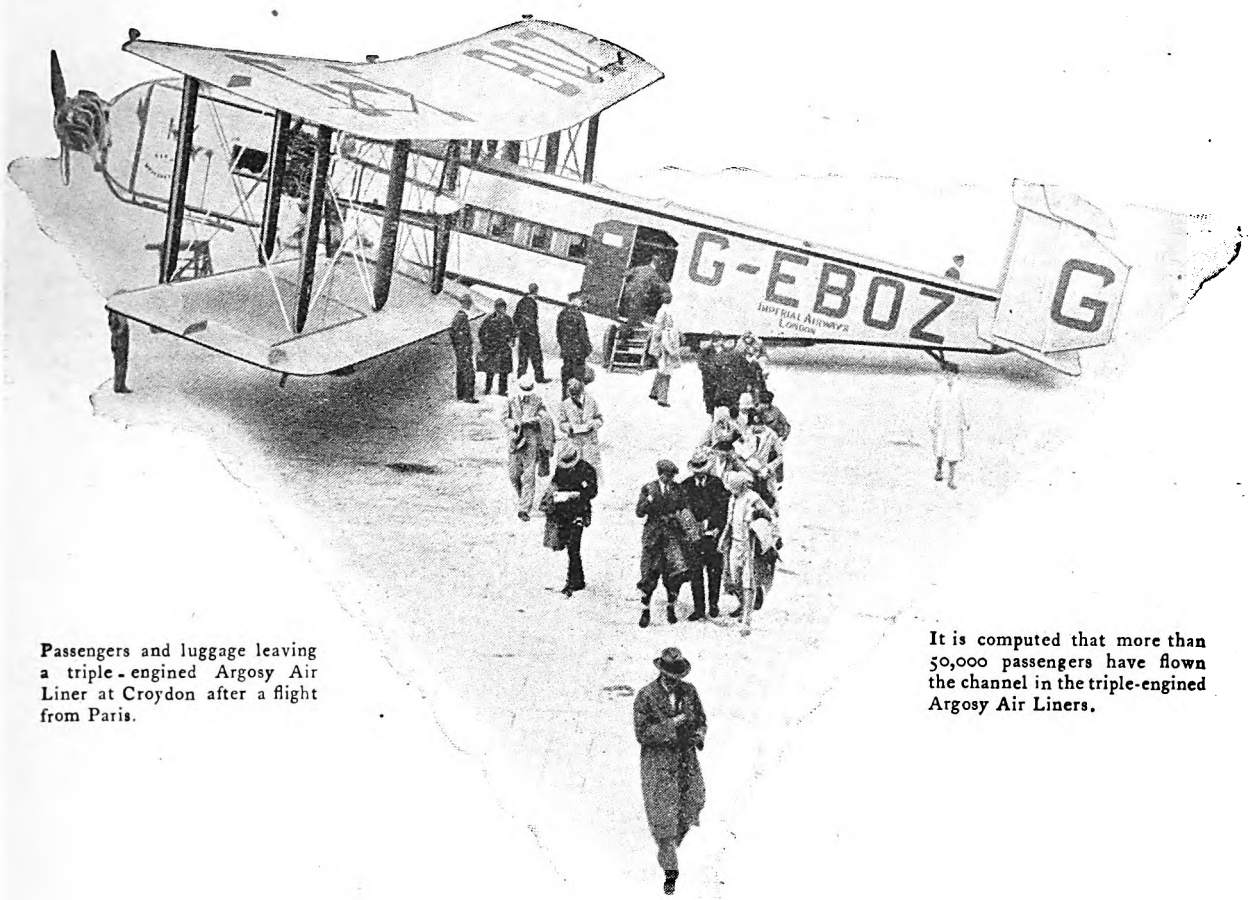

Passengers and luggage leaving a triple-engined Argosy Air Liner at Croydon after a flight from Paris.

It is computed that more than 50,000 passengers have flown the channel in the triple-engined Argosy Air Liners.

During the past four years the public record of the Armstrong Siddeley Engined

ARGOSY

AIR LINERS

has proved them to be the safest, best paying and most easily maintained Air Liners in existence.

The figures given below are totals relating to the operation of all seven Argosies in the European fleet of Messrs. Imperial Airways, Ltd.:

Total miles to 31st October, 1929	**919,320.**
Approximate number of Channel Crossings to 31st October. 1929	**3,750.**
Number of hours flown	**10 118.**

SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT LIMITED.

Works and Aerodrome: Whitley, nr. Coventry. London: 10, Old Bond Street, W.1.

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TITAN-ENGINED.—A Dutch Fokker F-VII.3m. monoplane supplied to the French Cie. Internationale de Navigation Aérienne and fitted with three French-built Titan engines.

inspiration in this business, and because of the vast number of aircraft-of-war which have been exported to various countries and to our Dominions overseas with Jupiter engines, the Bristol Company have helped materially in the progress of British Aviation in 1929.

Among the most successful aeroplanes with Jupiter engines has been the Westland Wapiti, which has been adopted as the standard general purpose machine of the Royal Air Force and the Royal Australian Air Force and by the South African Air Force. That in itself is very good propaganda for British aircraft engineering, so the Bristol Company and Mr. Roy Fedden may justifiably feel pride in the good work they have done.

Cirrus Aero Engines Ltd.

Cirrus Aero Engines Ltd. were incorporated in 1927. Before that date they had been built by a department of A.D.C. Aircraft Ltd. The original Cirrus Mark I engine was designed by Major F. B. Halford, who first acquired fame as the designer of the B.H.P. engine, to use up cylinders, crank-shafts, and other parts of old war-time French Renault engines which the Aircraft Disposal Company had in stock.

An engine was wanted at that time for the light aeroplanes which were then becoming popular, and the managing directors of the Disposal Company, Lt.-Col. M. O. Darby and Lt.-Col. J. Barrett-Lennard, had the foresight to see that there was going to be a market for light aeroplanes.

In quite a short while the demand for the Cirrus engine became so great, and the possibilities became so obvious, that Major Halford re-designed the engine, and as the stock of Renault parts began to run short, new and improved parts were designed to take the place of the war-time design and material. Consequently the Cirrus Mark II engine was a great improvement on the Mark I.

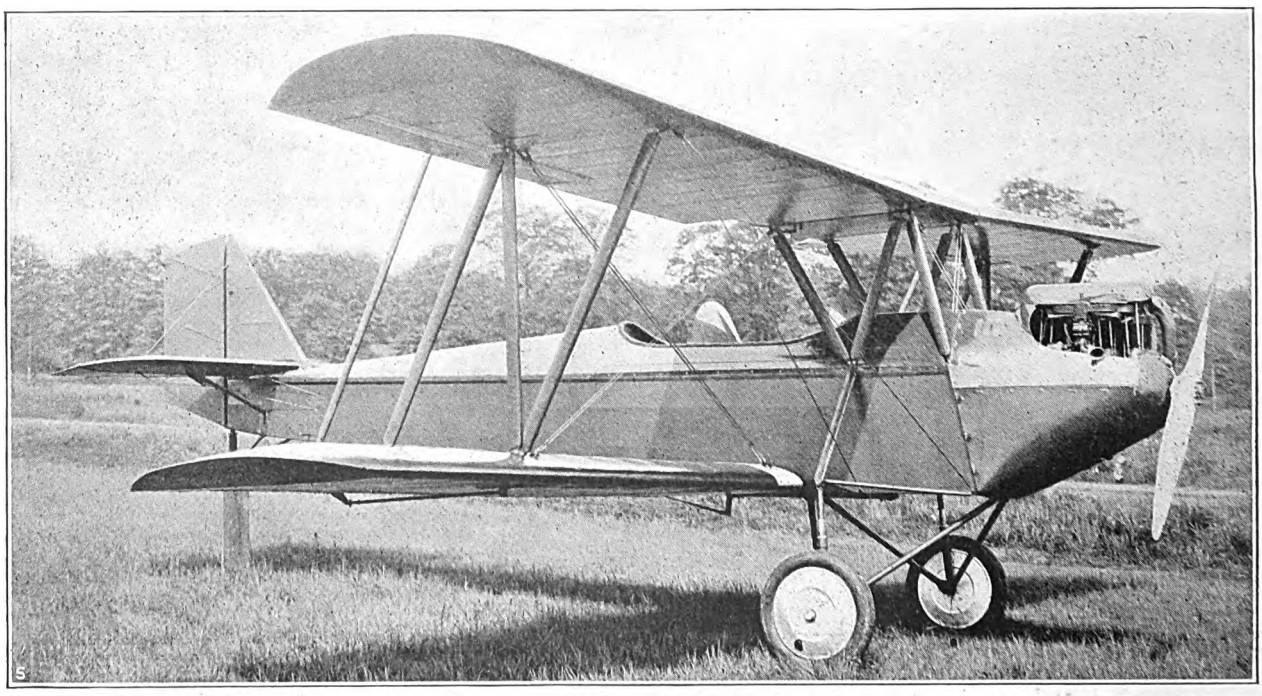
Still greater improvements were made in the Cirrus Mark III, which is the type now mostly used. The original Cirrus started with a rather problematical 70 h.p. and the Mark III Cirrus to-day gives a very comfortable 95 h.p., which with a little strict attention to business by owners and ground-engineers can be pulled up to something not far short of 100 h.p.

The firm's great achievement of 1929, has been the production of the Cirrus Hermes engine. Not only is the Hermes a slightly larger engine than the original Cirrus with slightly higher compression, but it has been improved in a variety of details, to make it more efficient. It is only 15 lbs. heavier than the Cirrus Mark III, but it gives between 15 and 20 more horse-power, and though one would hesitate to say that it is more reliable than the Cirrus, which has proved itself to be a highly reliable engine, it is certainly an engine which would stand more pressing at full power.

In Moths, Avians, Widgeons, and other light aeroplanes of British origin, the Cirrus, and to-day the Hermes, have penetrated all foreign countries.

An interesting feature about the Hermes engine which was mentioned in the section of this article which dealt with aeroplanes is the fact that the Cirrus Aero Engine firm, in conjunction with A.D.C. Aircraft Ltd., have produced a special type of cowling for the Hermes engine. This has been designed, as the result of extensive experiments, to give it the best possible cooling together with the least possible head-resistance. This cowling is produced so that aircraft designers can combine it with the general design of their machines.

Altogether the Cirrus Aero Engines have deserved well



CIRRUS-ENGINED.—An American New Standard D-29 two-seat light aeroplane with an American Cirrus III.

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WORLD'S RECORD WITH A GENET ENGINE

2670 km. (1,660 miles) in a straight line by Pilot Zimberly on a Barling N.B.3 fitted with an 80-88 h.p. Armstrong Siddeley Genet, at Brownsville, United States. (Light Aircraft Class 3.)

ARMSTRONG SIDDELEY

MOTORS LIMITED,

COVENTRY, ENGLAND, and 10, Old Bond Street, London, W.1.

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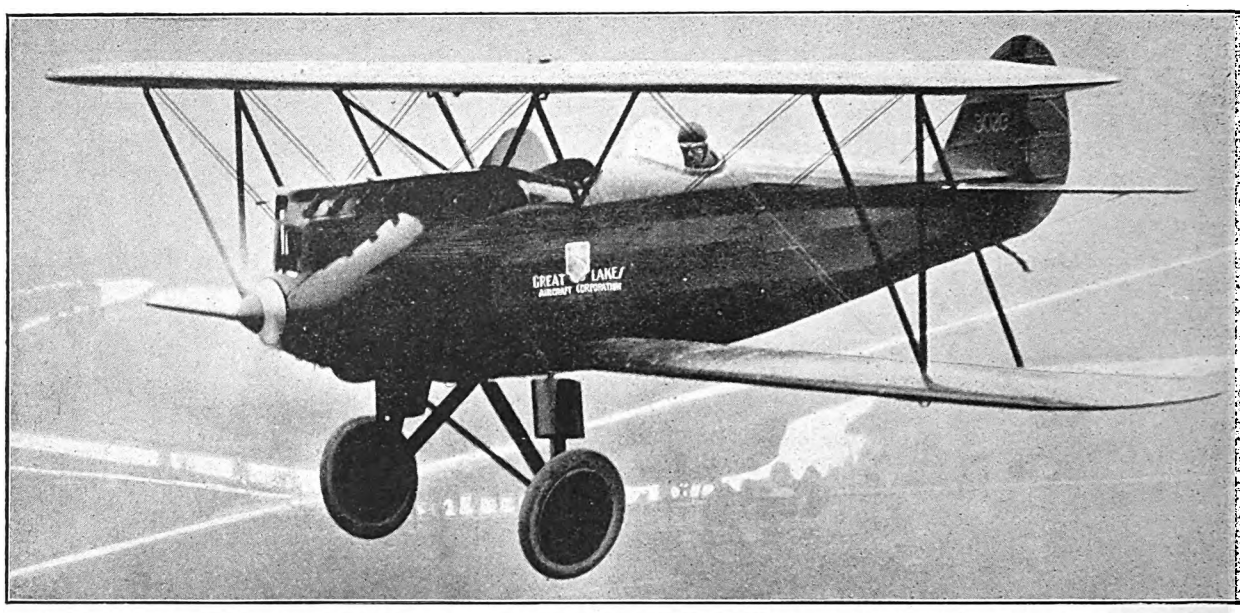


CIRRUS-ENGINED.—An American Great Lakes 2-T-1 two-seat light biplane fitted with an American Cirrus III.

of the British Aircraft Industry for their foresight in supplying an engine of the best British quality all over the world. That this is a fact may be seen from the number of foreign aircraft constructors who are using Cirrus engines in their own light aeroplanes.

The Cirrus and the Hermes were largely used by Continental aircraft constructors during 1929, as the list of entries in the Tour of Europe Competition showed. Also a licence to build Cirrus engines has been conceded to American Cirrus Engines Inc., and construction rights have also been bought by a Japanese firm.

At the end of the year Major Jack Stewart, who has been Sales Manager of the Cirrus engines since their beginning, was appointed General Manager of the firm. This in itself is a good move, for Major Stewart is well known to all aircraft constructors on the Continent and his knowledge of engines and of aircraft, coupled with his personality, ensures success.

INTERMEZZO.

That is as much space as can be spared for our Aero Engines this week. Next week we have to deal with the already famous De Havilland Gipsy engine, and with the Napier engine which has done good work for many years. Also, something is to be said of that entirely novel engine, the Redrup Lever Engine,—which is more or less of what is generally known as the swash-plate type. Also, there is the Rolls-Royce, which by winning the Schneider Trophy did so much to advertise British aeronautical engineering all over the World. In addition to these there is a new British firm which only began operations right at the end of 1929, to wit, the British Salmson Company, which has started to make over here the range of radial engines which have been so successful in France. And lastly there is the Sunbeam engine which is doing good work in the R 100 airship.

So much as has been said will at any rate indicate to readers that we are well in the forefront of the World's engineering, so far as our engines are concerned. Not only have they enabled our aircraft to put up performances which have beaten World's Records and have made our light aeroplanes recognised as the best in the World, but they have materially increased our export business.

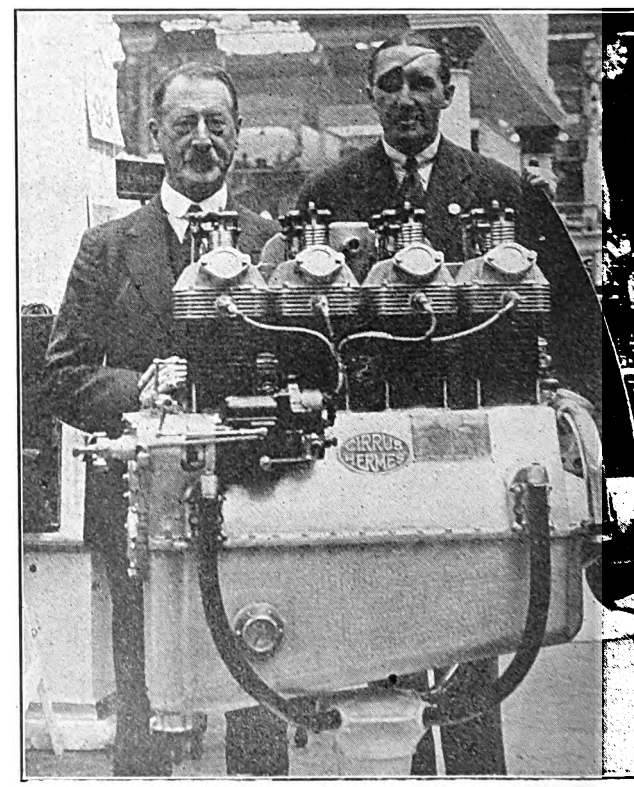
No country can live merely by making things and consuming them itself. If a country is to make a profit, it must sell its products abroad. Only in this way can foreign money be brought into a country to pay for all the things which it buys from foreign countries,—and to pay for its taxes.

Some things we might very well make ourselves but do not make, some things we cannot make or grow ourselves. But there is a great deal to be said for the argument that if we take the British Empire as a whole we ought to be absolutely self-supporting. There is no kind of food stuff which we cannot grow in the British Empire. And there is nothing which any of our Dominions can possibly want which cannot be manufactured in Great Britain, if we go the right way to work about it. And so, if the worst came to the worst, and all foreign Nations organised a trade boycott against us, the British Empire could still carry on quite happily in spite of them.

Without being in any way hostile to any foreign Nation, one can at any rate say that things should be so arranged that the British Empire should be self-supporting. At the present moment the use of aircraft for transport is so small that in spite of the lead given by the Prince of Wales, and by our various Air Ministers, and by some Prime Ministers, there are many in high places, and among politicians, and our big business men, and our newspaper proprietors, who hardly take aircraft as being an important factor in either our Empire Transport or in our Empire Trade. But within comparatively few years Air Transport will be recognised as essential. And then our exports of aircraft and aircraft material and parts will be quite of prime importance to our national revenue.

Therefore, there is considerable interest in considering how largely our aero-engines have contributed to the total amount of our aircraft exports, and how much more they are likely to contribute. Our Dominions Overseas can probably build aeroplanes, at any rate so long as wooden aeroplanes are tolerated. But they are not likely to build their own engines for some considerable time to come. And when our trade in aircraft increases to the extent of making our aero-engines on something like mass production principles, we ought always to be able to produce engines more cheaply than any of our Dominions can.—C. G. G.

(To be continued.)



CIRRUS ENGINES LTD.—Lieut.-Col. J. Barrett-Lennard and Major Jack Stewart.—(*"Aeroplane" photograph.*)

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TO READERS OVERSEAS.

By the time this issue of THE AEROPLANE reaches some of the further parts of the British Empire, and some of our readers in the Far East and in South America, and by the time any correspondence from those readers can get back here, certain new British commercial aircraft which are at present in process of construction should be well on the way to completion, and may be actually flying. At least half-a-dozen of these new machines have performances which are far in front of anything which has hitherto been offered to aircraft operators by manufacturers in any other country. And so they should be of particular interest to these more distant readers.

These new types include high-speed single-engined 2-3-seaters, high-speed twin-engined 4-5-seaters, high-powered twin-engined heavy freight-carriers, and high-speed twin-engined and three-engined freight-carriers and passenger-carriers. Thus the British Aircraft Industry will be able to offer to aircraft operators and prospective aircraft operators all over the World in three or four months from now a range of aircraft which for performance, economy, workmanship and material will be unsurpassed by any other country, and probably unequalled by any other country.

At the moment, as most of these machines are being built almost secretly, and as we do not wish to give away too much information to competitors in other countries, nothing can be said here and now about the detail arrangement of these machines, or the types of engines which will be used, or the performances expected, or the firms concerned.

Readers of this paper abroad know well that they can rely on information published in THE AEROPLANE. In this paper we have never eulogised aircraft with inferior performance, nor have we ever held out prospects of performance by British aircraft which have not been fulfilled. Even to such things as the prophecies of speed in the various Schneider Trophy Contests the figures in THE AEROPLANE have been quite reasonably accurate. Consequently readers overseas will be disposed to believe the statements which appear hereinbefore.

For that reason one hopes that aircraft operators and those who are interested in aircraft operation in the British Dominions and in foreign countries will not be in too much of a hurry to order, purely by the performances attributed to them on paper or by enthusiastic salesmen, machines which are not of British design and construction, but will when they read this issue of THE AEROPLANE write to people whom they know in England and ask them what is then coming out of British aircraft factories.

Naturally we of THE AEROPLANE will be happy to answer any such inquiries,—in so far as we are allowed to do so by the makers of new and interesting types,—and to put inquirers in touch with those makers whose products are most likely to interest them. Our reason for existence is the propagation of British Aviation, and we are always at the service of buyers overseas,—as is well known by the many who constantly write to and call at this office. And so there is all the greater pleasure in being able to tell our readers overseas that there are many new machines which will interest them in 1930.

The time to act is now, because inquiries from the more distant parts will not get back to this country before March or April, and full information cannot get out to the inquirers till May or June. Consequently, at the very earliest, deliveries to the more distant countries cannot be made before July or August. And by that time there ought to be a vastly increased demand for air transport all over the World.—C. G. G.

THE AIRWORTHINESS QUESTION.

On Thursday, Jan. 23, Mr. H. B. Howard will read a paper before the Royal Aeronautical Society on "Certificates of Airworthiness." The paper will be delivered in the Lecture Hall of the Royal Society of Arts, 18, John Street, Adelphi, W.C.2, at 6.30 p.m.

This is a subject of the utmost importance to the future of the British Aircraft Industry, for our future depends on our exports of Civil Aircraft, and whether we can compete with other nations depends on whether our new types can be certified as airworthy on a fair basis with our competitors. Therefore manufacturers, especially those who have only recently come into the business, should make a point of being present.

In his paper, Mr. Howard will consider in a general way the effect of airworthiness regulations on the design of civil aircraft. He will analyse the causes of accidents, pointing out that their occurrence is the acid test for any system of airworthiness. As a result of the analysis Mr. Howard comes to the conclusion that there is no evidence to suggest that our standards are insufficient. In the course of the paper the difficulties of International Regulations are pointed out.

The paper is one which, by its very nature, should produce a discussion of great value to designers, and it has, indeed, been written with this in mind.

BRITISH ENTERPRISE IN THE EAST.

The Fairey Aviation Company has recently sent on a Far Eastern tour, to investigate the progress of aviation and the prospects for civil aviation, a representative in the person of Mr. F. W. Carey, until recently a Commissioner in the Chinese Customs Service.

The Fairey Aviation Company has not definitely gone in for civil aviation, but its future policy may very well be guided by what is learned from the report Mr. Carey makes.

According to a Singapore paper, Mr. Carey arrived in Penang a short while ago. He has visited Medan, and arrived in Kuala Lumpur recently and left Kuala Lumpur for Singapore, and will thence proceed to Siam, possibly French Indo-China, and to China. In addition to the collection of material for his report, part of his time will be devoted to appointing suitable agents in the Far East for the Fairey Aviation Company.

Interviewed by a representative of the *Malay Mail*, Mr. Carey mentioned that in Penang he had found members of the Chinese community were extremely keen on having some kind of air lines brought into operation and considered it nothing short of disgraceful that mails between Penang and Singapore were 24 hours or even as long as 48 hours in transit when it could be made a question of a few hours only by the employment of not more than four 'planes on a Penang-Singapore service.

Mr. Carey went on to say that he was glad to learn of the establishment of a Flying Club, with Government assistance, in Kuala Lumpur, and thought it would be wise for the Government to subsidise a club of that kind in proportion to the number of 'planes owned by the club and the number of trained pilots. He thought Malaya was most backward in regard to aircraft development by comparison with Siam and China, where there was airmindedness on the part of the public. Malaya should not lag behind.

He went on to refer to Mr. Stratton-Browne's purchase of an aeroplane, and said he had seen him take off and land at his aerodrome at Sungei Besi, both of which operations he performed with skill. "I think he is a sportsman," was Mr. Carey's comment.

Incidentally, one learns from the Singapore papers that Mr. Carey is showing a very interesting film of the production of Fairey aircraft and of Fairey Reed Airscrews, which would no doubt be of interest to schools and colleges and engineering institutes and so forth in this country.

ITALY AND THE INDIAN AIR MAIL.

In future the Indian Air Mail is to follow a new route across Europe and the Mediterranean. The route will be Croydon — Cologne — Nuremburg — Vienna — Budapest — Belgrade — Uskub — Salonika — Athens — Crete — Alexandria. This route is actually about a hundred miles shorter than that through Switzerland and Italy, but the change was not desired by Imperial Airways.

The conditions which Italy tried to impose for a renewal of the agreement were such that no British Company could accept them.

Imperial Airways were to use the same ports as the Società Anonima Navigazione Aerea. The Italian Company was to run a machine between Genoa and Alexandria midway between the dates of each Imperial Airways trip. Italy insisted that Tobruk in Libya should be a port of call, though this was of no use to the British service.

Lastly when the agreement was to be renewed Italy wished to pool the income and take half the combined revenue of the Italian and British machines from the mails and traffic which would be carried. This claim was not merely to include traffic between Europe and Egypt, but to places as far beyond as India.

The catch comes in here because, in the twenty-five weeks before the Imperial Airways service stopped, the Italian line had not carried one single paying passenger on its intermediate trips. Naturally no business concern would accept such a proposition.

At present the mail goes by air to Cologne and by train to Athens, and thence by flying-boat lent by the R.A.F. to Imperial Airways till new or rebuilt Calcuttas are available. The stretch over Hungary and Jugoslavia is unflyable at this time of year.

One suggests to Imperial Airways that the time has now come when they should concentrate on high-speed mail-carrying machines to do the journey to Athens with only one or two stops,—and leave the passenger traffic to develop itself later on. Still later they should run mails non-stop to Malta, and thence by Cyprus to Palestine, and they should take passengers to Marseille (Lac de Berre) and thence by flying-boat to Malta.—C. G. G.

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THE ROYAL AIR FORCE.

The London Gazette.

Air Ministry, January 7.

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—The following Plt. Offs. on probation are confirmed in rank:—J. S. Tanner (Dec. 13, 1929); F. E. Abbott, J. A. Brown, C. R. Crow, J. S. Douglas, E. Esmonde, J. W. C. Glen, D. B. Knapp, H. V. L'Amy, A. E. V. Mathias, G. B. Musson, A. T. Orchard, T. J. Rees, E. G. Sharp, J. A. Simpson, G. R. Warner (Dec. 28, 1929).

The following are promoted with effect from Jan. 8:—

FLIGHT LIEUTENANTS TO BE SQUADRON LEADERS.—E. D. Davis, R. S. Sorley, D.S.C., D.F.C., M. Moore, O.B.E., H. G. Crowe, M.C., H. P. Lloyd, M.C., D.F.C., F. P. Adams, F. M. F. West, V.C., M.C., T. S. Ivens, C. T. Anderson, D.F.C., C. A. Stevens, M.C.

FLYING OFFICERS TO BE FLIGHT LIEUTENANTS.—E. V. S. Lacey, H. N. Hawker, G. C. Stemp (Lt., The Buffs, R.A.R.O.), G. D. Harvey, J. F. F. Pain, G. R. Beamish, J. H. Hutchinson, A. P. K. Hattersley, C. W. Croxford, D.S.C. (Hon. Flt. Lt.), H. H. Brookes, R. H. Barlow, R. Melbourne, S. H. V. Harris, P. R. Gardner, the Earl of Bandon, J. G. Franks, A. C. H. Sharp, G. N. J. Stanley-Turner, J. Warburton.

The following Plt. Offs. are promoted to the rank of Flg. Off.:—F. A. R. Bishop (Oct. 8, 1929); C. V. Howes, P. K. Robertson, P. J. Connolly (Nov. 25, 1929).

Sq. Ldr. J. H. O. Jones ceases to be seconded for duty with the British Advisory Staff in Chile (Dec. 22, 1929).

The following Lts., R.N., are reattached to the R.A.F. as Flg. Offs. with seniority of June 16, 1924, and with effect from the dates indicated:—S. T. Morgan (Dec. 26, 1929); J. I. Robertson (Dec. 27, 1929).

Plt. Off. on probation S. R. Hall resigns his S.S. comn. (Dec. 24, 1929). The following relinquish their S.S. comns. on account of ill-health:—Flg. Off. W. A. Shorten (Jan. 6); Plt. Off. on probation J. D. Roden (Jan. 8).

The following Flg. Offs. are transferred to the Reserve (Jan. 6):—CLASS A.—W. F. Bryanton, P. B. Chubb, E. J. Ellis, F. S. Homersham, D.C.M., M.M., B. E. Moody, A. C. Watkins.

CLASS C.—L. B. McGoverne, V. J. Sofiano.

The S.S. comns. of the undermentioned Plt. Offs. on probation are terminated on cessation of duty:—M. A. Murtagh (Dec. 31, 1929); A. M. Wood (Jan. 5).

MEDICAL BRANCH.—Flt. Lt. M. O'Regan is transferred to the Reserve, Class D (ii) (Jan. 4).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—The following Plt. Offs. are promoted to the rank of Flg. Off.:—L. F. Hooper, P. L. D. Teichman-Derville (Dec. 25, 1929); J. G. Naz, E. W. Seymour-Hosley (Dec. 29, 1929). Flt. Lt. P. Stainer is transferred from Class A to Class C (Nov. 10, 1929); Flg. Off. E. J. Dilnutt is transferred from Class B to Class C (June 2, 1929). The following are transferred from Class AA (ii) to Class C:—Flg. Off. E. P. Swallow (Dec. 28, 1929); Plt. Off. J. L. Browne (Sept. 17, 1929). The following relinquish their comns, on completion of service:—Flg. Off. E. Marler (Dec. 29, 1929); Plt. Off. H. W. P. Stewart (Dec. 23, 1929). Flg. Off. W. McGowan relinquishes his comn. on completion of service, and is permitted to retain his rank (Dec. 21, 1929).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 605 (COUNTY OF WARWICK) (BOMBER) SQUADRON.—The following Plt. Off. to be Flg. Off.:—J. R. H. Baker (Dec. 14, 1929).

A Fatal Accident.

The Air Ministry regrets to announce that as the result of a collision in the air at Abu Sueir, Egypt, between two Avro machines of No. 4 F.T.S., Abu Sueir, on Jan. 8, Flt. Lt. Richard Samuel Greenslade and Flg. Off. Charles Edson Galpin, the pilots of the aircraft, and 359134, Cpl. William Henry Chilman and 358853, L-AC. Leonard Vincent Green, the other occupants, were killed.

No. 54 (Fighter) Squadron, R.A.F.

The new Fighter Squadron now being formed at Hornchurch, Essex, will be known as No. 54 (Fighter) Squadron.

The original No. 54 Squadron, Royal Flying Corps, was formed in February 1916 at Castle Bromwich under the command of Major K. K. Horn, M.C. The Squadron was equipped with Sopwith Pups (the first Sopwith Pups to be issued to the R.F.C.) and flew out to France in November 1916, landing at St. Omer.

In December they were stationed at Bertangles. The Flight Commanders were Alan Lees (now Sq. Ldr. A. Lees, O.C., No. 56 (F) Squadron, R.A.F.), J. C. Russell (now Wing Cdr. Russell, D.S.O., Directorate of Organisation and Staff Duties, Air Ministry), and W. V. Strugnell (now Wing Cdr. Strugnell, M.C., O.C., No. 9 (B) Squadron, R.A.F.). This is a fine record, considering that there were still two years of war to follow when these officers took their flights to France.

During the German retreat in June 1917 No. 54 Squadron moved forward to Athies, almost due east of Amiens.

In July 1918 Major Horn was relieved by Major R. S. Maxwell (now Wing Cdr. R. S. Maxwell, M.C., D.F.C., A.F.C., No. 70 (B) Squadron, R.A.F.) in the command of the Squadron. At the same time the Squadron moved to the coast and was re-equipped with Sopwith Camels and took over ground-strafing duties. They then moved to help in the defence of Chateau Thierry, between Paris and Reims, where the American Army first showed its fighting power by a gallant defence and counter-attack. Here 54 Squadron distinguished themselves by their valuable work, ground strafing in defence of the bridges.

Just before the British advance they moved north again, and at the time of the Armistice they were at Merchin Aerodrome and part of the Xth Brigade. The Squadron was reduced to Cadre and then disbanded early in 1919.

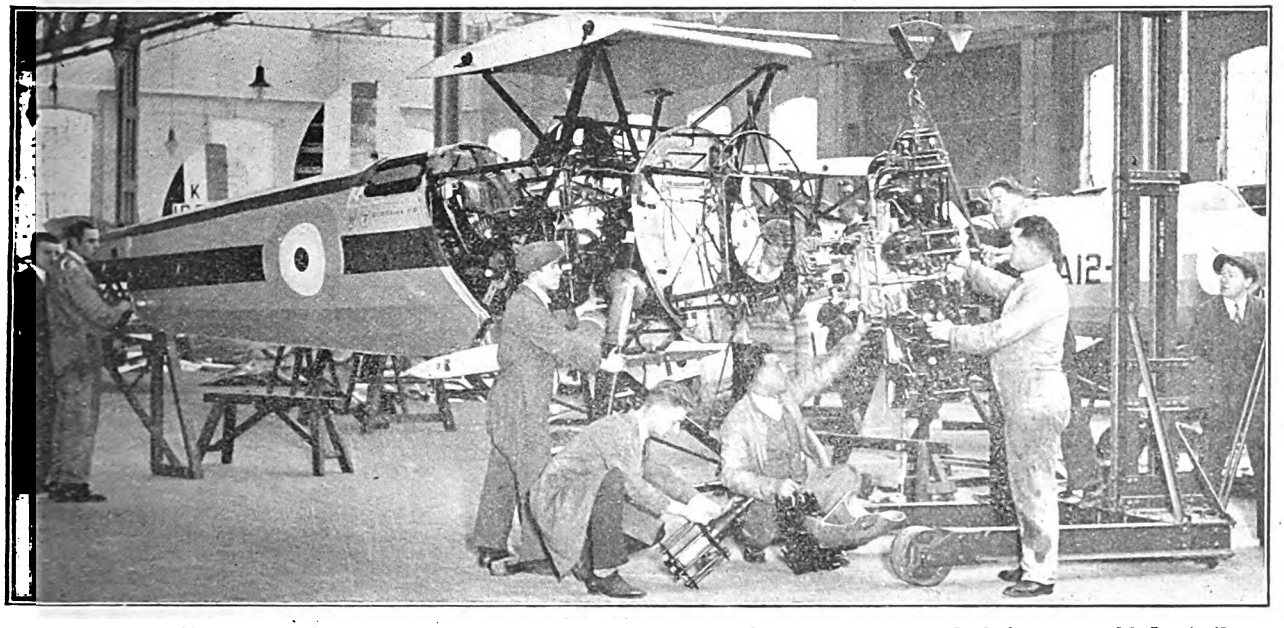
No. 47 (Bomber) Squadron.

On Dec. 23, 1929, His Excellency the High Commissioner for Egypt and the Sudan, Sir Percy Loraine, flew as a passenger in a Fairey III.F of No. 47 (Bomber) Squadron, R.A.F., from Wadi Halfa to Khartum, a distance of 545 miles in four hours five minutes, at an average speed of 135 m.p.h.

The train journey from Wadi Halfa to Khartum takes about 24 hours.

Sir Percy Loraine is enthusiastic about air transport and has shown great interest in the work of the R.A.F. in the Middle East. He used the machines of No. 47 (Bomber) Squadron, during his visit to the Northern Sudan.

On Dec. 19 a Fairey III.F of No. 47 (Bomber) Squadron, piloted by Flt. Lt. R. N. Waite, flew from Alexandria to Khartum in 9 hours 45 minutes. The course followed was



NEW FIGHTER EQUIPMENT.—A Bristol Bulldog (Jupiter engine) for the R.A.F. being assembled at the Bristol Works.

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Assiut, Edfu, Assuan, Wadi Halfa, Atbara. Stops were made for re-fuelling at Assiut and Wadi Halfa. The total time for the journey, including the stops, a distance of 1,270 miles, was 11½ hours.

A Marshal of the Royal Air Force.

A certain amount of misapprehension seems to exist concerning the retirement of the Chief of the Air Staff from his office.

According to The King's Regulations and Air Council Instructions for the Royal Air Force, Paragraph 3564 Section 6 "A Marshal of the Royal Air Force will not retire. If not employed he will remain on half-pay."

Therefore Marshal of the Royal Air Force Sir Hugh Trenchard, although he has retired from the Office of Chief of the Air Staff, is still on the Active (half-pay) List of the Royal Air Force.

In the same way in the Army a Field-Marshal does not retire, but goes on half-pay. But in the Navy, an Admiral of the Fleet after a period is placed on the Retired List.

The Pilot's Assister.

According to the British Correspondent of *Aviation* of New York, the Air Ministry has permitted public reference to the Pilot's Assister or Robot Pilot.

It has been developed by the R.A.E. and is now officially declared as being capable of controlling an aeroplane far more precisely than a skilled human pilot. The exact details of the device have not been made public but the basic principle is the use of a gyroscope to maintain level stable pilot. This is driven by compressed air by a wind-driven compressor, and compressed air is used to operate pistons linked to the ailerons, rudder and elevators.

It is said to be capable of correcting variations of a fraction of a degree from the set course. The pilot can at any moment take over control by turning a tap which cuts off the power from the controls and, should this ever fail, there is an emergency pin in the pipe line which when pulled out at once releases all pressure.

With this device test flights of 400 miles have been made without the pilot once touching the controls.

According to the *Journal de L'Aviation Française*, of Paris, the following British aircraft have been tested with the Pilot's Assister: D.H.9a, Southampton flying-boat, Hyderabad and Virginia night bombers, and a squadron of Virginias has also been completely equipped.

The same journal also says that the Fairey Long-Range monoplane on its flight to Karachi was fitted with a device which allowed it to fly for hours without a visible horizon and also that Imperial Airways Ltd. has fitted one of its aircraft with a gyroscopic control.

[The really interesting thing about all this is that American and French papers should know so much while we in this country, who pay for the thing, are left entirely ignorant of any of the facts stated above. It merely shows the folly of having a Secret List while other countries have official Air Attachés.—C. G. G.]

The R.A.F. Staff College.

The following officers have satisfactorily completed the seventh course (1929) at the R.A.F. Staff College, and are entitled to the letters *p.s.a.* after their names in the Air Force List of their respective Services:—

ROYAL AIR FORCE.

Wing Commanders H. J. F. Hunter, M.C., L. T. N. Gould, M.C., I. T. Lloyd, E. W. Havers (Stores Branch).

Squadron Leaders J. H. D'Albiac, D.S.O., E. L. Howard-Williams, M.C., W. E. G. Bryant, M.B.E., L. O. Brown, D.S.C., A.F.C., D. Colyer, D.F.C., R. V. Goddard, H. W. L. Saunders, M.C., D.F.C., M.M., V. R. Gibbs, D.S.O.

Flight Lieutenants H. G. Crowe, M.C., E. D. Davis, L. E. M. Gillman, F. L. Hopps, A.F.C., A. P. Ledger, M.B.E., J. A. McDonald, F. H. E. Reeve, F. N. Trinder, J. G. Walser, M.C., W. M. Yool.

DOMINION AIR FORCES.

Royal Australian Air Force.—Squadron Leader G. Jones, D.F.C., Flight Lieutenant W. Palstra.

Royal Canadian Air Force.—Squadron Leaders A. L. Cuffe, G. V. Walsh, M.B.E.

Flying Prospects in India.

Air Marshal Sir Geoffrey Salmond, Air Officer Commanding R.A.F., India, in an interview with a Press representative recently in Poona, described his flight from Delhi to Mantapam and back, a distance of 3,500 miles.

According to the report he said that there could be no better means of seeing India in a short time than flying From Delhi the first day's flight would be to Saugor. Next day Secunderabad would be reached and on the third day Madras. From there a visit to Ceylon would be made on the fourth day, landing at Mantapam on the return in the absence of good landing ground in Ceylon. On the fifth day Bangalore would be reached, thence to Poona on the sixth day, on to Mhow the following day and back to Delhi on the eighth day.

He could see that a genuine interest in flying among Indian peoples in the future was very bright, particularly for light aeroplanes. One of the things wanted now was that every municipality should have a landing ground. Any information regarding grounds and aviation requirements would be available from Delhi. It was the municipalities in England and America and other countries which provided landing grounds and in India, too, they could become the very basis of the entire organisation. Everything was in favour of flying, but the initiative should come from people locally.

Sir Geoffrey Salmond explained that the purpose of his flight was to reconnoitre various landing grounds and ascertain their suitability for the landing of big machines like his. With the development of flying in India most of the civil and military transport would be done with heavy machines. He found most of the grounds very satisfactory under ordinary conditions. His flight had been thoroughly successful. It was wonderfully interesting to watch the change in the nature of the country from dry, parched fields to waterlogged Secunderabad. Flying through a monsoon had not proved difficult as they found it possible to dodge clouds, either flying round or above them.

A Bombing Accident.

A *Reuter* message, published in *The Times* of Jan. 8, states:—

Two persons were killed and four injured by the explosion of a Royal Air Force bomb at Khiri, in Southern Kordofan, Anglo-Egyptian Sudan. Bimbashi E. H. Hall, of the Army Medical Corps, Mr. A. S. Oakley, Assistant District Commissioner of the Talodi, and L-AC. Prust were among the injured.

The Siamese Visit to India.

The officers of the Royal Aeronautical Service of Siam who have been visiting the R.A.F. Stations in India, left Delhi on Jan. 10 for Allahabad. From Allahabad they are returning to Siam.

Feisal ed Dowish.

The Times correspondent in Baghdad, in a message dated Jan. 10, states:—

The victorious forces of the Wahabi King are hotly pursuing the rebel Wahabis, who are seeking refuse in Koweit and 'Iraq territory.

I hear from a trustworthy source that the Sheikh Feisal ed Dowish, the leader of the Mutair rebels, was captured by a British force consisting of aeroplanes and armoured cars operating in the desert south-west of Basra.

Feisal ed Dowish is now interned under an armed guard in the Air Force camp at Shaibah, near Basra. Details of his capture are still scanty. A force of armoured cars of the 'Iraq Army has left Baghdad for the disturbed area. It was reported last week that the Wahabi King's pursuing forces were not far from the 'Iraq frontier.

A message from Jeddah of the same date states:—

After receiving the news of the capture of Feisal ed Dowish, the Hejaz Government sent a message to the British Government demanding the delivery of the rebel sheikh and all other fugitives, according to the pledges given by the Governments of Iraq, Koweit, and Transjordan. A meeting to discuss the question is expected to be held at Ebeid, near the frontier of Nejd, between representatives of the Hejaz, Iraq, and the British High Commissioner in Koweit.

Permanent Commissions in the Medical Branch.

The following medical officers have been accepted provisionally for permanent commissions:—

Flight Lieutenants:—Valentine Vincent Brown, John Edward Foran, M.B., Arthur Leicester St. Aubyn McClosky, James Francis McGovern, M.B., John Milne Ritchie, M.B.

Flying Officers:—John Henry Cullinan, Brendan Bartholomew Kennedy, M.B.

A.O.C.'s are to arrange for these officers to be examined at the Central Medical Establishment for officers serving at home, and by the headquarters or other approved medical board of the command concerned for officers serving abroad, and are to report the results forthwith to the Secretary of the Air Ministry, forwarding at the same time written acceptances of permanent commissions from the officers concerned.

Musketry in the Middle East.

The annual Middle East Command Musketry, Pistol and Lewis Gun Competition was held at Abu Sueir, Egypt, on Dec. 9, 10, and 11. Teams were entered by No. 14 (Bomber) Squadron, No. 45 (Bomber) Squadron, No. 47 (Bomber) Squadron, No. 2 Armoured Car Company, Station H.Q., Heliopolis, H.Q., Middle East, and two teams each by No. 4 F.T.S. and the R.A.F. Depot, Abukir. With the exception of No. 47 (B) Squadron, who were allowed to fire the competition at Khartum under the supervision of the Army authorities, all teams fired at Abu Sueir.

The Pistol Competition was won by No. 4 F.T.S. A to K team with a score of 215 out of a possible 420. The individual Pistol Championship was won by Cpl. Whiting of No. 14 (B) Squadron with a score of 68 out of a possible 105.

The Lewis Gun Competition was won by No. 45 (B) Squadron (Flg. Off. Patch and L-AC. Huxford), with No. 4 F.T.S. L to Z team (Sjt. Macrae and L-AC. Roberts) second.

The second day was devoted to the Individual Rifle Championship. Over 80 entries were received for each of the four practices to be fired, each practice consisting of 10 rounds with two sighting shots at various ranges. The results were:—

500 yds. Deliberate.—(1) Sjt. Shawcross, N. 4 F.T.S. "L—Z," 47; (2) Flt. Lt. Greenslade, No. 4 F.T.S. "A—K," 46.

300 yds. Rapid.—(1) Sjt. Hill, No. 2 A.C.C., 39; (2) Sjt. Webb, No. 4 F.T.S. "L—Z," 39.

300 yds. Snap.—(1) S-M. Loughead, No. 4 F.T.S. "L—Z," 42; (2) L-AC. Kelly, No. 4 F.T.S. "A—K," 42.

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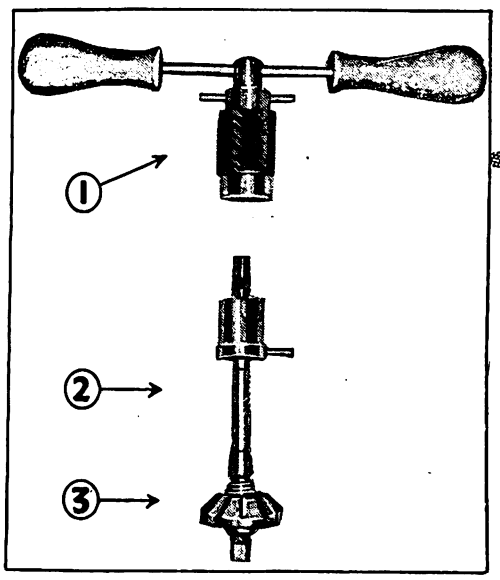

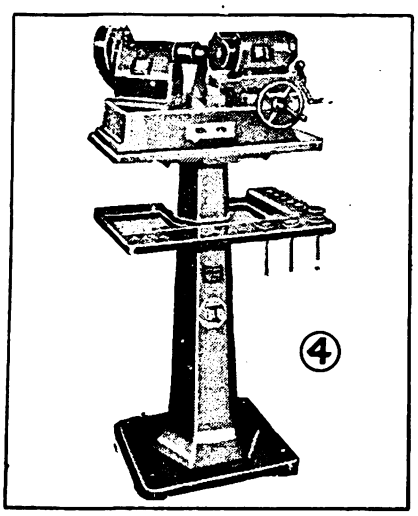

SAFETY IN THE AIR

ABSOLUTE accuracy of valve functioning is vital to engine efficiency . . . . . to safety in the air. Misalignment between Seat and Guide almost invariably causes Valve failure, "burning-up" of valve and seat, and distortion. Recutting the Valve Seat true to its guide, and refacing the Valve true to its stem are essential.

The Black and Decker Self-Centreing Aircraft Pilot (Fig. 2) with Turning Handle (Fig. 1) and Reamer with High Speed Tungsten Steel Blades (Fig. 3) ensures accuracy to the *n*th degree, recutting even the toughest Bronze Seats with remarkable speed and simplicity. There are three Pilots giving range from 11/32" to 11/16"—fitting practically all engines.

The Black and Decker Valve Refacer, shown mounted on pedestal (Fig. 4) grinds new valve faces with perfect precision. Capacity 1/8" to 41/64" Valve Stems. Angle adjustments 15° to 90° graduated. All standard voltages.

For better, SAFER engine performance, use:—

BLACK & DECKER

AIRCRAFT ENGINE

VALVE TOOLS

Obtainable from all Machine Tool and Equipment Supply Houses

BLACK & DECKER LIMITED . . . SLOUGH . . . BUCKS.

D.A.

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200 yds. Deliberate.—(1) Flt. Lt. Greenslade, No. 4 F.T.S. "A—K," 48; (2) Sjt. Webb, No. 4 F.T.S. "L—Z," 47.

Eleven teams entered for the Rifle team Championship which was won by No. 4 F.T.S. (L to Z team) with a total score of 1,096 out of a possible 1,600. No. 47 (B) Squadron were second with 1,029.

The teams were:—

No. 4 Flying Training School "L—Z."—S-M. Loughead (Capt.), Sjt. Shawcross, Sjt. Payne, Plt. Off. Lusk, Sjt. Palfreman, Sjt. Macrae, Sjt. Mutton, Sjt. Webb.

No. 47 (Bomber) Squadron.—Flt. Lt. Waite (Capt.), Sjt. Smith, Sjt. Parnell, Cpl. Ockenden, L-AC. Mansell, L-AC. Reep, L-AC. Odell, L-AC. Robinson.

No. 14 (Bomber) Squadron and No. 4 F.T.S. "A-K" tied for 3rd place with a total score of 1,005.

Night Flying.

An Air Ministry Order states that aeroplanes without navigation lights will be flying at night between Jan. 13 and Mar. 31, over an area enclosed by Westerham, Sevenoaks, Keston and Warlingham. Aircraft will be flying about 6,000 ft. and will switch on their navigation lights if they see any other aeroplanes in their immediate vicinity.

Low Flying.

At a General Court Martial at Farnborough on Jan. 9, Flg. Off. V. H. Nicolay, No. 4 (A.C.) Squadron, R.A.F., was found *Guilty* on charges of flying too low over thickly populated parts of Southampton and of performing aerobatics over an infants' school at Sholing.

Sentence will be promulgated later.

SEAPLANE WAR.

[*Above and Beyond Palestine.* An account of the work of the East Indies and Egypt Seaplane Squadron 1916-1918. C. E. Hughes. With 63 Illustrations by the Author. IX. 268 pp. 2 Maps. Benn. Supplied by THE AEROPLANE BOOK DEPARTMENT, Cannon House, Pilgrim Street, E.C.4. 10s. 6d. net. Postage 6d.]

As the author of this book says, there is a dearth of accounts dealing with the activities of the East Indies and Egypt Seaplane Squadron during the War 1914-21. Mr. Hughes was a soldier during that period, and was attached to the Squadron as an Intelligence Officer, and the book we have before us was written during the closing year of the War. In criticising it this latter point is material, for, from the military student's point of view, the book suffers from a wealth of anonymity.

Those officers and men who served with the Squadron will find the book a delightful one to read, for Mr. Hughes is a competent writer, but those who are fresh to the subject and wish to gain an accurate knowledge of the operations conducted by the Squadron will, in some measure, be disappointed. This is not meant as an adverse criticism, for the author disarms the critic by his prefatory note, yet it is an arguable point whether or not the value of his account would have been increased if he had mentioned by name the very gallant actors whose deeds he so delightfully chronicles. Moreover, however much the delinquencies of the Short seaplane were cursed, surely the poor old thing deserves better than to be referred to as "a double-seater seaplane." Even authors should observe the conventions!

The book is at its best, paradoxically, when not dealing with operations, but when describing the *terrain* and the peoples with which the author came into contact, and certainly he has succeeded in bringing back to the reviewer on a wet January afternoon something of the glamour of the places in which they both have journeyed. In this connection, the book is enriched by numbers of pen-and-ink drawings which the author made at the time. Many of these are delightful, but the reviewer is worried by two of them. First, the one of Marseilles, for, according to this, the famous gilt figure of Notre Dame is no more, and secondly, try as he may, he cannot recognize part of Port Said from one of the sketches.

The accounts of the operations from the *Ben-my-chree*, the *Anne*, and from the *Raven*, are most interesting, but here again the reviewer thinks that it would have been better to have mentioned officers by name, rather than by nicknames which are known but to few.

The book is well produced, but, in any future edition, the reviewer suggests that better maps be supplied. The present ones, although well drawn, are on too small a scale, and, moreover, do not show the topography of the country. This is hardly fair, because it is to the glory of the Squadron that its pilots did not hesitate to fly right inland over Palestine in seaplanes, and Palestine is a mountainous country, and the uninformed reader might be able to judge better of the pilots' gallantry if he could gain some better idea of the country.

In conclusion, on the last page the author tells us of another journey he made, and we can but hope that it will not be long before he gives us an account of this trip as delightfully written as the present one.—C. F. S. G.

THE HEAD-HUNTER.

[*The Red Knight of Germany.* By Floyd Gibbons. 392 pages, 8 illustrations, appendix, and index. Cassell & Co. Ltd. Supplied by THE AEROPLANE BOOK DEPARTMENT, Cannon House, Pilgrim Street, E.C.4. 7s. 6d. net. Post 6d.]

This is the story of the life and death of Captain Baron Manfred von Richthofen, a War-time pilot of the German Air Service, as it has been collected from various sources. A great deal of the book is based on von Richthofen's own book, a translation of which into English was published in 1918 by THE AEROPLANE under the title of *The Red Air Fighter*. As this book is now out of print, Mr. Floyd Gibbons' book may be useful to many who are interested in the development of fighting in the air, though its educational value is largely spoiled by padding.

Manfred von Richthofen has been likened, in conversation and in print, to the British fighting pilot as a type, but Mr. Gibbons' book does not give that impression. He was undoubtedly a fine pilot and a very courageous man, but according to this book he was essentially a braggart whose personal glorification came before that of his country, his service, or his squadron With the exception of a mild degree of hero-worship of Boelcke, whose achievements he was chiefly concerned with beating, he is made to appear as if he had no appreciation or admiration of the work of anyone but himself. Even when he has been in action with his Squadron with some degree of success, he is made to attribute the whole of the achievement to himself.

There may have existed during the War 1914-18, or since, British pilots who thought more of their own glory than of that of their Squadrons, and who had no appreciation of other pilots or of their men, but one has not met them.

The Red Knight of Germany has one advantage over *The Red Air Fighter*. There is more detail in it. The Author has had access to official documents, including German combat reports. He has also had interviews with or letters from men who actually fought against von Richthofen, several of whom were wounded and made prisoners, and he has, from various sources, a full account of the battle in which Captain Roy Brown, R.A.F., fought and destroyed von Richthofen. And the essence of this matter is there.

Like many other fine fighting pilots, von Richthofen did not take kindly to the air. After several months as an observer he was trained to be a pilot. After twenty-five lessons in dual instruction in the air he went solo and wrecked the machine on landing. "His actions were entirely mechanical. He followed instructions to the letter. He did exactly as he had been told to do, but he lacked the 'feel' of the air and of his machine." After a further two weeks of intensive cramming he again failed to pass his tests. It was six months after his first attempt to fly solo that he finally qualified and joined a unit at the front. However, perseverance and a careful study of all the elements of air combat made him the most successful fighting pilot in Germany, and according to his own claims, most of which were substantiated, he brought down 80 Allied aircraft with his own hand.

The book is a little long and a little monotonous in its gruesome details and in Mr. Gibbons' inevitable reactions to American sentimentality, but it will probably have a tremendous circulation, because the latest form of humbug in the shape of the Geneva Conscience will say that it is sufficiently horrible to persuade the coming generation to salve its honour with kind words.—C. M. MCA.

THE LADY MAUD HOARE.

The Lady Maud Hoare, D.B.E., wife of Sir Samuel Hoare, former Secretary of State for Air, met with an accident at St. Moritz. on Jan. 11, and broke a leg while skating.

The Lady Maud Hoare is an enthusiastic air traveller and accompanied her husband on many flights during his period of office in the Government. The many friends she made at that time in the Aviation world will be very sorry to hear of her accident and will wish her a quick recovery.

A GOOD FLYING FILM.

Readers of THE AEROPLANE who enjoy a good film as well as those who are interested in the military aircraft and training of other countries should not fail to see the new sound-film at the Capitol Cinema, Haymarket, W.1.

Apparently the producers borrowed a Squadron of Curtiss Falcons of the U.S. Marine Corps for several weeks, at any rate the Squadron appears throughout the film. The first scene shows the Squadron looping in "V" formation and throughout the film one sees and hears it at work in a minor war.

The formation flying is wonderful, particularly the scene in which the Squadron is ordered into action at night and takes off in formation by the light of a powerful searchlight. The Squadron's flight from Florida to Nicaragua is filmed from one of the machines in the formation and shows a diversity of country as well as a view of the Atlantic Fleet lying in harbour. The bombing of the stronghold of the Nicaraguan bandits is also shown from one of the bombers who attack their objective, which is down in a gully, in line ahead.

The story is much more intelligent than film stories usually are and in places is extremely amusing. Military details have been approved by a former officer of the U.S. Marine Corps.—C. M. MCA.

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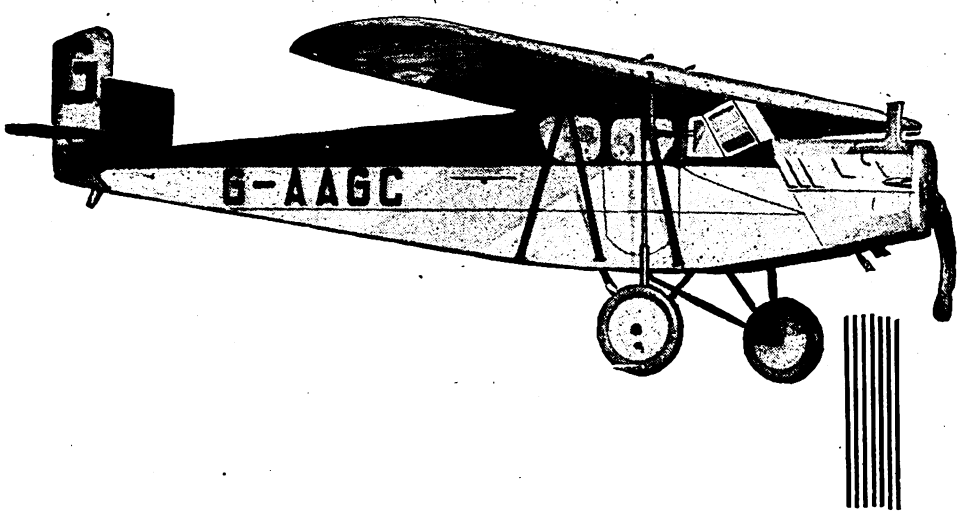

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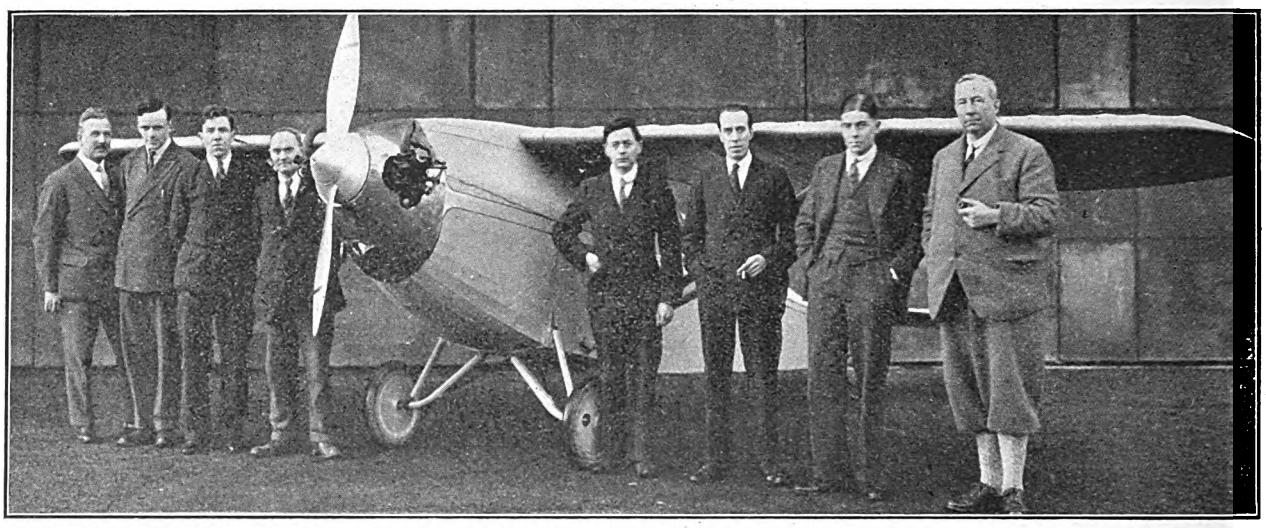
THE COMPER SWIFT.



THE STAFF.—Personnel of the Comper Aircraft Co. On the extreme right is Mr. Dawson, the Chairman of the firm, with Mr. Comper beside him.

The Swift is the first product of the Comper Aircraft Co. Ltd., but will not be the only type to be built by this firm. Several other designs are in course of preparation, including a two-seat high-wing cabin monoplane with side-by-side accommodation, which will be known as the Aircar.

As is now generally known the Comper Co. have their factory at Hooton, in Cheshire, on the site selected during the war for the assembly of American-built Handley Page bombers. The factory was built but never completed. The Comper Co. are therefore in ideal surroundings where they have ample room for expansion.

The premises of the company are so arranged that a line method of production is used. The raw material enters the factory at one end and the finished aeroplane can be wheeled straight onto Hooton aerodrome, where all flying tests can be made. There also potential customers can try out the capabilities of the Swift and, after buying, can fly the machine away.

Hooton aerodrome lies 8 miles S.W. of Liverpool and is one of the finest landing grounds in England. The Liverpool and District Aero Club also have their premises on the aerodrome, which has a full commercial licence.

A brief description and a line drawing and specification of the Comper Swift were published in THE AEROPLANE for June 19, 1929. This machine has now been completed and has successfully made its first flights.

The Comper Swift is a single-seat high-wing braced monoplane with a 40 h.p. A.B.C. Scorpion twin-cylinder horizontally-opposed air-cooled engine. It has the good speed range of 3 to 1 and has been designed as a fast sporting or touring machine with a low initial cost.

The Swift should also be of value to Flying Clubs as it can be used for solo pupils instead of having to allot them dual-control machines which are needed for instructional purposes. The use of a 40 h.p. single-seat machine in the place of a 90 h.p. two-seat aeroplane should go far towards cutting the costs of this period of training.

The Swift retains all the best features of the C.L.A.3 which was so successful at the various Lympne meetings. By placing the cockpit aft of the wing, good visibility has been added. The wing chord is level with the pilot's eyes and the fuselage bulkheads which support the wing together with the decking have been so arranged that by an inclination of the head the pilot can see right ahead on either side.

CONSTRUCTIONAL DETAILS.

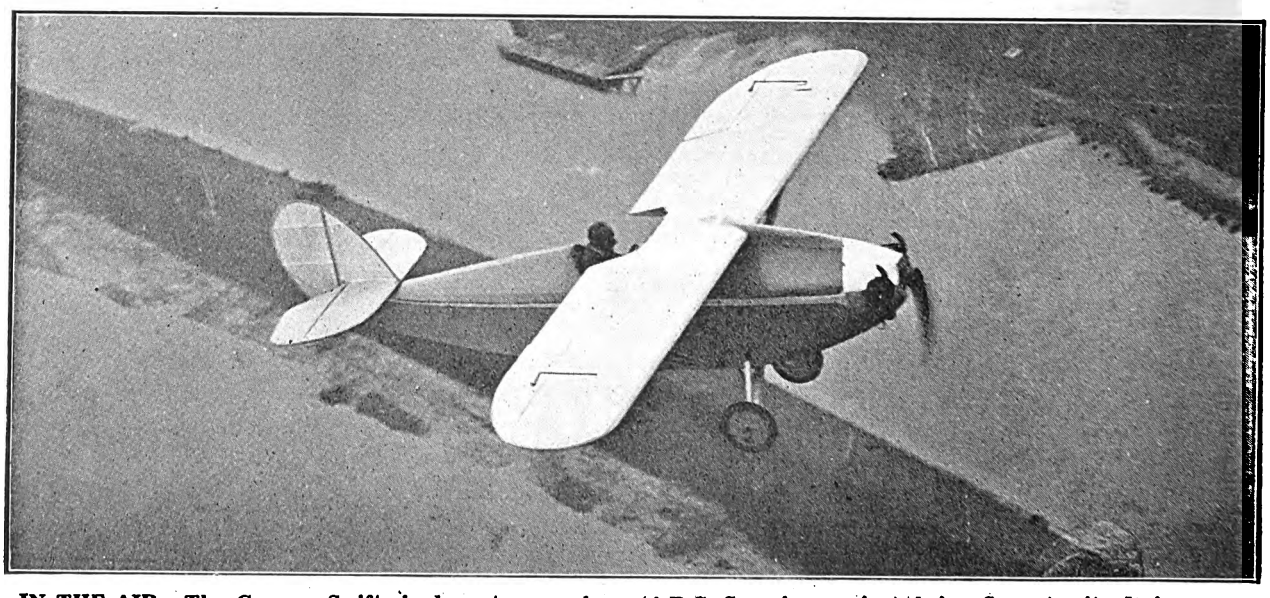
The wing is in three portions. The centre section is supported by two fuselage bulkheads. There is no trailing edge to this section as it has a cut-out which extends to the rear spar. The front and rear spars are each attached by simple plate-fittings of steel to extensions of these bulkheads. There is an intermediate spar to this section which supports part of the control gear.

The outer sections of the wings are hinged at the rear spar to the centre-section and can be folded back in the usual way. The spars are of spruce, routed and spindled for lightness. The ribs are of built-up girder construction with plywood gusset-joints. Intermediate nose-ribs preserve the true wing-section profile and are further stiffened with a plywood cover at the leading-edge only. The drag bracing is by wooden compression-struts and tie-rods.

The ailerons are hinged to the rear spar and are of similar construction to the wings.

The outer portions of the wing are braced by two Vees of steel tubes, one on each side, hinged to the lower fuselage longerons. The wings and ailerons are fabric-covered. Picket rings are provided on the underside of the wings near their extremities.

The fuselage is in three portions bolted together, a feature which minimises repair, replacement or transport costs. The front portion is a rigidly-braced wooden structure especially designed to take the A.B.C. Scorpion. Where higher powered engines are desired for special purposes a modified design of front fuselage may be bolted direct to the middle portion.



IN THE AIR.—The Comper Swift single-seat monoplane (A.B.C. Scorpion engine) being flown by its designer, Flt. Lt. Nicholas Comper.

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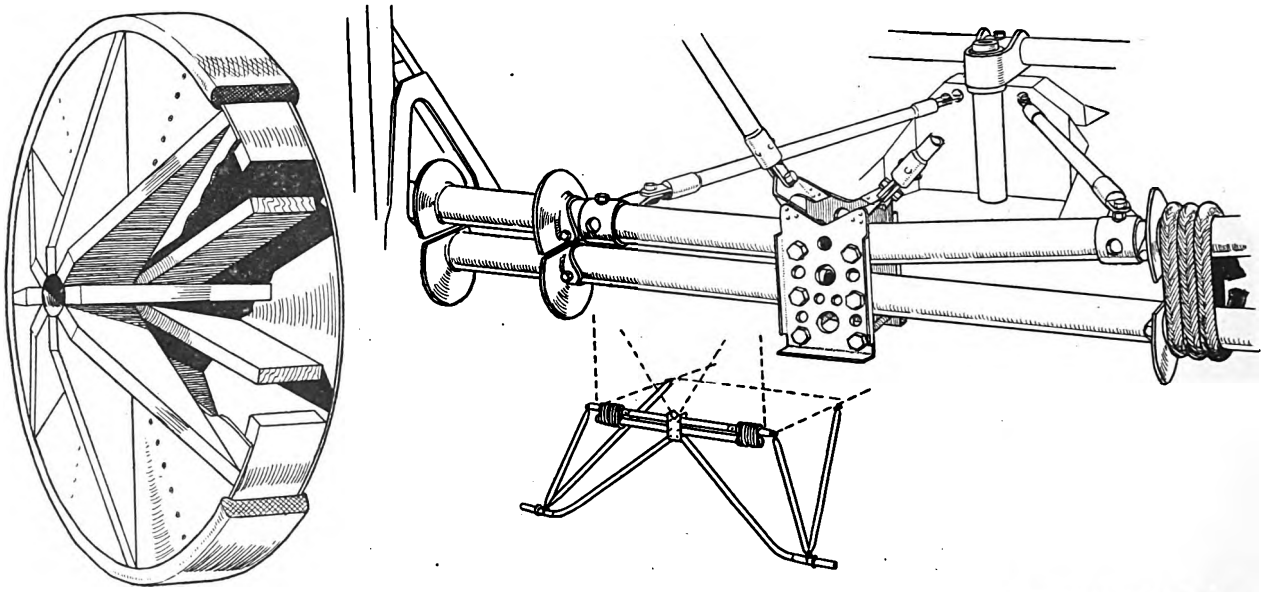


SWIFT DETAILS.—On the left a Comper wooden wheel and on the right the springing arrangement of the undercarriage.

The engine-mounting bolts are supported in the Comper Vibration Absorbing Unit, which is an ingenious device for damping out all engine vibration.

This unit has been thoroughly tried out and has proved eminently successful in service. The engine-bearer bolts each pass through and compress a rubber block which is mounted in such a way that the bolts do not come in contact with the casing of the device. The Unit has been patented.

Four of these Units are strapped to the fuselage, two at the lower longerons and two on top of two ash bearers. To these Units the engine is attached. The usual fireproof bulkhead is placed between the engine-mounting and the fuselage.

The central portion of the fuselage extends from the face of the front-spar bulkhead to the rear of the pilot's seat. This portion is also of wood and rigidly braced. The longerons and struts are of spindled spruce with plywood gussets.

The centre-section is supported by extending two of the fuselage bulkheads upwards by inwardly sloping struts, with plywood attached transversely on both sides as bracing. The decking is shaped and covered with plywood.

The tail portion is similar in construction to the other parts except that the decking is completely separate and detachable so that inspection of the entire rear fuselage may be made without removal of the fabric covering.

The whole of the fuselage is covered with fabric stretched over formers and doped.

The tail-unit is of the normal monoplane type. The fin and rudder are built with welded steel tube. The rudder post and the fin post are of high tensile steel tube and are cantilever units.

The tail-plane of symmetrical wing section is adjustable on the ground. There is a short stabilising strut on each side to the fuselage, but the tail-plane is virtually a cantilever structure. The tail-plane is of rigid wooden construction and is covered with fabric. All the control surfaces are unbalanced.

The undercarriage is of the divided type with a novel method of shock absorption. The radius rods and axles are hinged to the centre-line. Nearly vertical struts from the wheels on each side are attached to radius arms hinged at the centre of the fuselage and inside it. These arms are arranged so that they can only travel in the vertical plane and when horizontal they rest on stops.

They are attached at their extremities inside the fuselage to fixed tubes by rubber cord in tension. A load on the wheel forces the vertical strut up and with it the radius arm, thus putting a tension in the rubber cord.

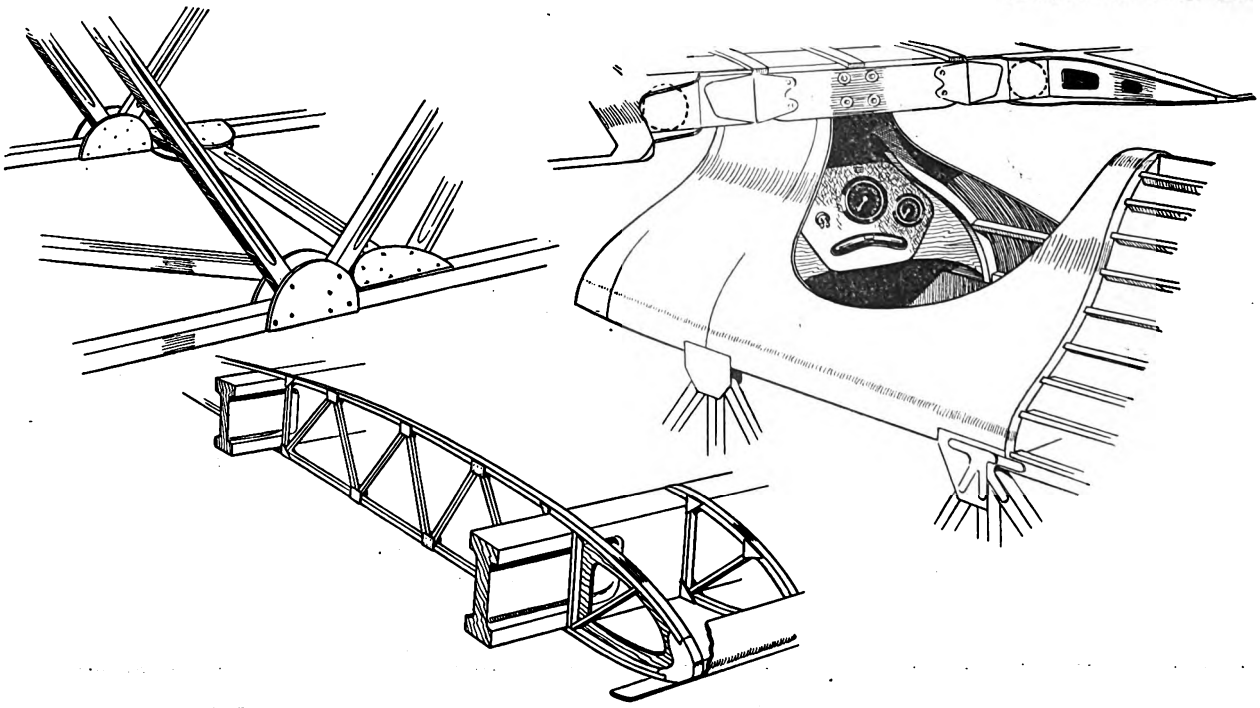
The engine is a 40 h.p. A.B.C. Scorpion, the mounting of which has been described above. A 9-gallon (41 litres) petrol tank is mounted in the nose of the fuselage behind and above the engine to which it feeds by gravity. One gallon of this is in reserve and is available by operation of a separate control.

The cockpit is immediately behind the rear spar and so arranged that the pilot can see equally well above and below the wing.

A neat oval instrument board is placed at the centre of the dash. The revolution indicator at the top, the engine switches to the left, the oil-pressure gauge to the right and a cross level at the bottom. The air-speed indicator and altimeter are attached to the rear spar, to port and starboard respectively, level with the direct line of vision.

The seat is supported by hinges at the back and by wires from the front edge. The arrangement allows for individual adjustment. The rudder-bar is adjustable and from it the wires run direct to the rudder.

The control-column is hinged to the end of a longitudinal torque-tube, which is mounted in bronze bearings on the floor of the cockpit and runs forward beneath the centre-section. The torque-tube ends in a lever which is connected with a push-pull tube to an arrange-



SWIFT DETAILS.—Above on the left is the method of fuselage construction and below a typical wing rib and section of spar. On the right is shown the cockpit in a n unfinished state.

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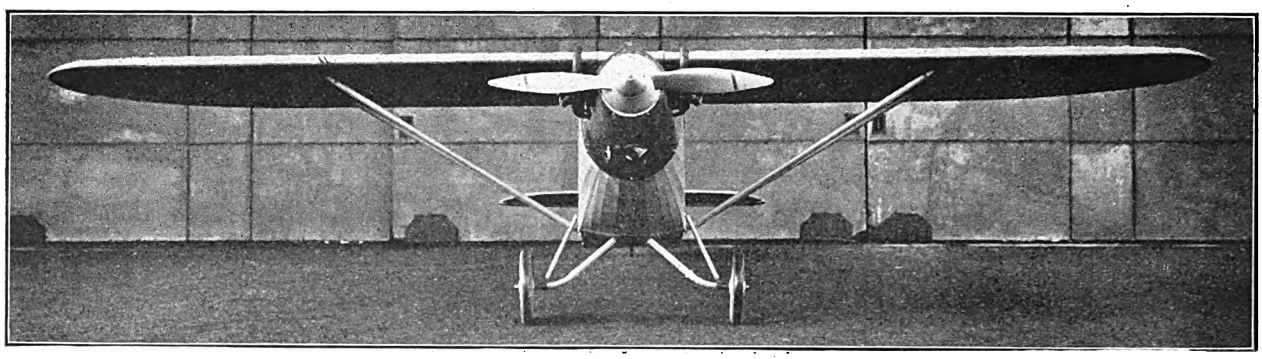


FRONTAL AREA.—A front view of the Comper Swift (A.B.C. Scorpion engine and Fairey-Reed airscrew).

ment of levers in the centre-section whence double wires run to cranks on the front spar. From these cranks movement is transmitted to the ailerons by push-pull tubes.

The elevator is operated by a push-pull tube from the control column to a rocking shaft behind the pilot's seat. Thence double wires run aft to a rocking shaft beneath the tail-plane. The elevators are operated with push-pull tubes to levers on the one-piece elevator spar.

There are no control-wires running outside the body or wings. This is a feature typical of the whole aeroplane. There are very few parts exposed to the slipstream. The photographs show that only the wing-struts, part of the engine and part of the undercarriage-structure and the tail-plane-stabilising-struts form excrescences.

Part of the engine must be exposed for cooling purposes. The whole of the shock-absorbing gear of the undercarriage is contained within the fuselage. The drag of the undercarriage will be further reduced when the Comper Wood wheels are fitted. These wheels are eleven pounds lighter than their metal counterparts, and have been passed as quite strong enough for their work. Their drag is less and as no tyres or inner tubes are needed there can be no punctures.

DIMENSIONS.—Span 24 ft. (7.3 m.), Length 18 ft. 4 in. (5.56 m.), Height 5 ft. 7 in. (1.7 m.). Wing area 90 sq. ft. (8.35 sq. m.), Folded dimensions 7 ft. 6 in. by 18 ft. by 6 ft. (2.29 m. by 5.49 m. by 1.83 m.).

WEIGHTS AND LOADINGS.—Weight empty 331 lbs. (151 kgs.), Weight loaded 600 lbs. (273 kgs.). Wing loading 6.66 lbs./sq. ft. (3.25 kgs./sq. m.), Power loading 15 lbs./h.p. (6.8 kgs./h.p.).

PERFORMANCE.—Speed, maximum, 105 m.p.h. (169 km.hr.), Cruising speed 80-90 m.p.h. (130-145 km.hr.), Landing speed 35 m.p.h. (56.4 km.hr.), Initial rate of climb 700 ft./min. (213 m./min.)

The C.L.A.4 biplane is being used as a flying test-bed. On this machine the Vibration Absorbing Units were tested for months and on the same machine were tested the wood wheels. The other day the C.L.A.4 was landed hard enough to break the undercarriage and wreck it. The Comper wood wheels came through the ordeal intact and showed no sign of strain.

Much practical testing and development work has been done by the Comper Company before they placed the Swift on the market. This means the elimination of teething troubles, which fact, coupled with the clean appearance and good performance of the machine should go far towards making the Swift a success.

A VISIT TO THE SAUNDERS-ROE WORKS.

There is a legend that what Lancashire thinks to-day England thinks to-morrow. This old saw is now obsolete. As is already known the old-established firm of S. E. Saunders, Ltd., of Cowes, Isle of Wight, which incidentally should celebrate its centenary this year, has changed its name to Saunders-Roe, Ltd. The change was the result of the re-organisation of the company by the accession of Sir Alliott Roe and Mr. John Lord to the Board of Directors. This Lancastrian invasion of the Isle of Wight will, one ventures to suggest, have far-reaching effects on the aircraft production of Vectis.

The original firm of Saunders had by virtue of its honourable career through one hundred years, suffered from growing pains such as are associated with modest beginnings and gradual expansion. The original works, on the east bank of the Medina, had expanded as best it could by taking over existing buildings in the neighbourhood. The original manufactures were boats of the smaller kinds, which called for very modest plant and simple wood-working machinery. And in 1912 the Saunders firm made our first flying-boat hulls. During the War 1914-18 naturally it entered the Aircraft Industry. This move entailed further expansion and the building of sheds too big to be built adjacent to the original works. Land was acquired on the West bank of the Medina, and large sheds and slipways were erected, but never quite completed. These sheds were placed at the disposal of the Royal Aero Club for the housing of the competitors in the 1923 Schneider Trophy Contest by Mr. Sam. Saunders.

The end of the War stopped the mass-production of aircraft, and S. E. Saunders Ltd. reverted to their original calling as high-class boat-builders. The firm did not abandon aircraft construction, but it was forced to regard aircraft as a second line.

More recently it has produced experimental aircraft of wood construction, as was only to be expected for a firm which prided itself on its wood-making experience, and one that undoubtedly has as much such experience as any other firm in the country—if not more.

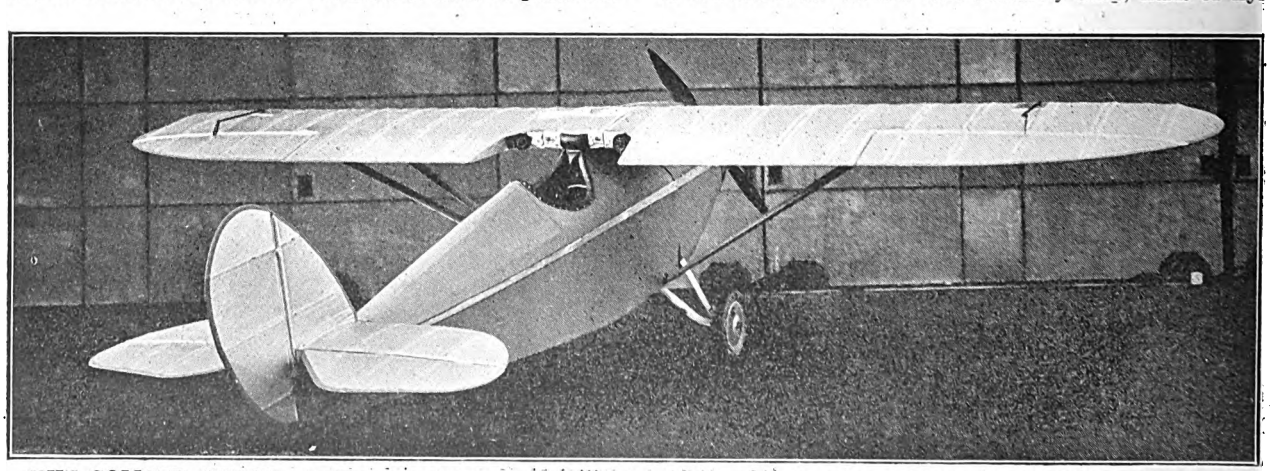
When Sir Alliott Roe and Mr. Lord joined the firm it was housed under many roofs, totally unsuited for quantity production of aircraft. Their incursion has resulted in drastic re-organisation of the Works,—which are now arranged on an up-to-date line system.

The General Offices and drawing offices are housed in a large house on the East bank of the Medina. Structural alterations are still being made here but already the company has one of the finest drawing offices one has seen.

The Stores, Machine Shops, Inspection Department and Unit Assembly Shops are in what is known as the Maresfield Works. This originally consisted of two buildings divided by a road. This road has been roofed over and a floor put in and this new shop has been made into an Inspection Department.

On one side of this department is the Machine Shop and on the other is the Unit Assembly Shop. Below the latter is the Stores.

The top end of the Inspection Shop has been walled off and here are situated the anodic treatment baths, foundry and blacksmith's shop. The two last mentioned are outside the building but in correct relation to their sequence in construction. In the unit assembly shop, hulls of flying-



THE COMPER SWIFT.—A three-quarter rear view of the Swift, showing the cockpit arrangement, with the altimeter and air-speed indicator on either side of the cut-out of the trailing edge.

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boats, fuselages, wings, tail units, etc., are assembled ready for final assembly.

From this shop all units are transported to the Final Assembly Shop on the West bank of the Medina, which is known as the Solent Works.

This large shed is given over entirely to final assembly from the already assembled units received from the other side of the river. At one end are benches arranged progressively so as to enable four Blackburn Bluebirds to be completed weekly. At the back are the doping and wing-covering departments.

Saunders-Roe Ltd. is building Bluebird light aeroplanes for the Blackburn Co. and has laid down a batch of sixty-five, twenty-five of which are for National Flying Services.

The first six have just been completed and by the time this has appeared in print they should have been delivered by air from Cowes to Hanworth.

The firm is also building six Cutty Sark light twin-engined flying-boats. The first production machine is now complete and is being fitted with an amphibian gear prior to its despatch to Australia.

The sales of the Blackburn Bluebird are in the hands of Auto-Auctions, Ltd., and the result of their work was visible by the number of packing cases in the shop addressed to Australia, Rhodesia, East Africa, etc.

Other machines in the shops are of a military nature. One is a three-engined all-metal flying-boat of interesting design. Another is a single-engined multi-gun fighter. But both are of a semi-secret nature so one may only refer to their bare existence.

Besides the Aircraft Works already referred to, Saunders-Roe Ltd. include two other works, one, the Cornubia Works, where motor-boats of all kinds, etc., are built, the other the Folley Works, given over exclusively to the manufacture of ply-wood.

The latter works has the biggest ply-wood press in this country, and manufactures all manner of ply-wood, "Plymetl," which is a sandwich of wood and thin sheet metal all glued together, and the famous "Consuta" ply-wood which after glueing is sewn together with copper wire.

These two works are also being modernised with the result that production will be speeded up considerably.

The wings of the Cutty Sark are to be built at the Folley Works, where the ply-wood is actually made, thus saving space in the Maresfield Works, which is needed for metal construction, and economising in the transport of the raw material. When the wings are complete they will be floated down the Medina River on barges to the assembly shops.

The remaining branch of the Works is a Marine Garage which is being installed in the old Saunders assembly shed near the Maresfield Works. This is complete with a pier and slipway and when finished will provide every service for motor-boat and seaplane owners. Alongside will be petrol and oil pumps, rest room and other luxuries.

The transformation of the old works will be finished in about two or three months, by which time the introduction of modern Manchester production methods should be in full swing.

Without casting reflections on the original firm of S. E. Saunders, Ltd., the pioneer firm of boat builders, one may say that by its alliance with pioneers of aircraft construction the Isle of Wight will now become an important centre in the Aircraft Industry of this country.

A GYRATORY OCCASION AT HESTON.

On Oct. 22, 1925, Señor Don Juan de la Cierva presented his paper on the autogiro to the Royal Aeronautical Society. As Senr. de la Cierva at this time did not speak English with the fluency that now marks his use of the language, Sir Sefton Brancker read the paper.

One may therefore suppose that it was a direct result of his remarks on that occasion that led to the appearance of the Director of Civil Aviation at Heston Air Park on Jan. 7 last when he made his first flight in an autogiro with Flt. Lt. A. H. C. A. Rawson as pilot.

The occasion was quite a field day for the press photographers, cinema people and the microphone experts of the Movietone who had their equipment all over the concrete apron in front of the sheds at Heston.

The programme was somewhat delayed by magneto trouble. Like all good aero-engines the Armstrong Siddeley Genet Major, with which this model of the autogiro is fitted, has two magnetos. Owing to some form of stage fright or similar complaint induced by cameras and microphones and other evidences of Fame, one of the two magnetos so far forgot itself as to become mistimed.

This had to be put right and to avoid delay the magneto was disconnected. A nice point for argument, is whether this invalidated the airworthiness certificate and if so was the D.C.A. condoning or committing a breach of his own regulations. [Obviously it did, and he was.—ED.]

The autogiro had been fitted with dual control so that the D.C.A. might try out the controls for himself. Which he did.

When the engine had been warmed up and the rotor blades had been given a preliminary shove round by some helping hand, the machine gravely taxied out across the aerodrome with the four blades slowly sweeping round. When he had gone far enough, Flt. Lt. Rawson turned across wind, turned his tail unit into a deflector screen and opened up the engine.

The normal rotor speed in flight is, for this model, about 160 r.p.m., and the deflecting tail unit will only give a speed of about 90 r.p.m. therefore the machine must be taxied forward until the blades are doing 140 r.p.m.,—when the machine will take-off.

After a brief wait the autogiro turned into wind and took off. One of the Heston Moths took off with a camera-man on board just behind the autogiro and the take-off of the two machines seemed comparable. But once in the air the difference in top speeds was noticeable. On the other hand the angle of climb is quite as important as speed of climb, as it determines the distance needed to clear an obstacle of given height. The latest model of the autogiro seems to have quite a good angle of climb.

After evoluting round the sky, while being chased by the photographic Moths, the autogiro made what seemed to be a vertical landing out in the middle of the aerodrome. This may have been so, as there was quite a breeze blowing and the minimum flying speed is about 28 m.p.h.

The performance was repeated after the machine had taken-off again. The next time Flt. Lt. Rawson tried a parachute landing, Capt. Baker, the chief instructor at Heston, on an Airwork slotted Moth did the same trick and made a very good show too. When the actual landing was made of course the gyratory machine had the advantage as it was fitted with brakes.

Finally the autogiro was landed right in front of the tarmac from a height of some thirty feet or so. The way the machine just settled down and stopped without any run at all was quite staggering. Flt. Lt. Rawson then taxied up to the camera, swung round on one wheel with the aid of his wheel-brakes, and stopped. The rotors also stopped almost immediately as they are fitted with a band brake around the main hub, just above the supporting pylon.

The following is the specification, and the performance-figures claimed for, the autogiro C19 Mk. II which is fitted with the 100 h.p. Armstrong Siddeley Genet Major.

DIMENSIONS.—Span 30 ft. (9.14 m.), Height 10 ft. (3.05 m.), Length 30 ft. (9.14 m.), Chord of stabilising plane 2 ft. 6½ in. (0.76 m.), Area of stabilising plane 25.74 sq. ft. (2.38 sq. m.).

WEIGHTS AND LOADINGS.—Weight empty 850 lbs. (385 kgs.), Weight loaded 1,400 lbs. (635 kgs.), Disposable load 550 lbs. (249.48 kgs.), Stabilising wing loading 3.3 lbs./sq. ft. (16.1 kgs./sq. m.), Rotor loading 48.9 lbs./sq. ft. (239 kgs./sq. m.).

PERFORMANCE.—Speed, maximum, 95 m.p.h. (152.89 km.p.h.), Initial climb 500 ft./min. (152.4 m./min.), Range 280 m. (450.62 km.), Take-off run (in still air) 30 yds. (27.4 m.), Landing run (in still air) 10 yds. (9.14 m.).

THE HINKLER AIR BEACON.

On Nov. 30 the Prime Minister of New South Wales switched on the first aerial beacon in Australia. This light has been installed on top of the State Theatre and Shopping Block in Sydney by Union Pictures Ltd., a company which own moving picture theatres all over Australia.

The beacon is known as the Hinkler Air Beacon and is a white light revolving every 25 seconds. A neat chart is being distributed by Union Pictures Ltd. which shows the bearings of the various aerodromes and the Macquarie lighthouse from the Hinkler Beacon.

THE BRITISH GLIDING ASSOCIATION.

Air Vice-Marshal Sir Sefton Brancker, the Director of Civil Aviation, has consented to become President of the British Gliding Association. As a result of the Gliding Lunch, on Dec. 4, a Provisional Council has been formed.

This Council has drawn up rules and has made arrangements so that it may affiliate clubs and promote branches all over the country.

On Mar. 25 a meeting of founder-members and prospective members will be held, when the British Gliding Association will be officially inaugurated. Up to this date founder-members can be enrolled at one guinea, which should be sent to Mr. L. Howard Flanders, at the Royal Aeronautical Society, 7, Albemarle Street, W.1. These members will have power to vote and elect members of the Council at the inaugural meeting.

THE LONDON GLIDING CLUB.

The first Gliding Club to be affiliated to the British Gliding Association has been formed with Mr. S. O. Bradshaw as hon. Secretary. The members of the Committee are Mr. Manton, Mr. Ashwell Cooke, Mr. Douglas Culver and Mr. E. K. Blyth.

This committee are investigating the London area for suitable gliding grounds and are making arrangements to acquire gliders. Very shortly an inaugural meeting will be held, after which they hope to start active gliding.

This is good, as there now seems a chance of having a Gliding Club actively under way before Dr. Georgii's lecture to the Royal Aeronautical Society on Feb. 19.

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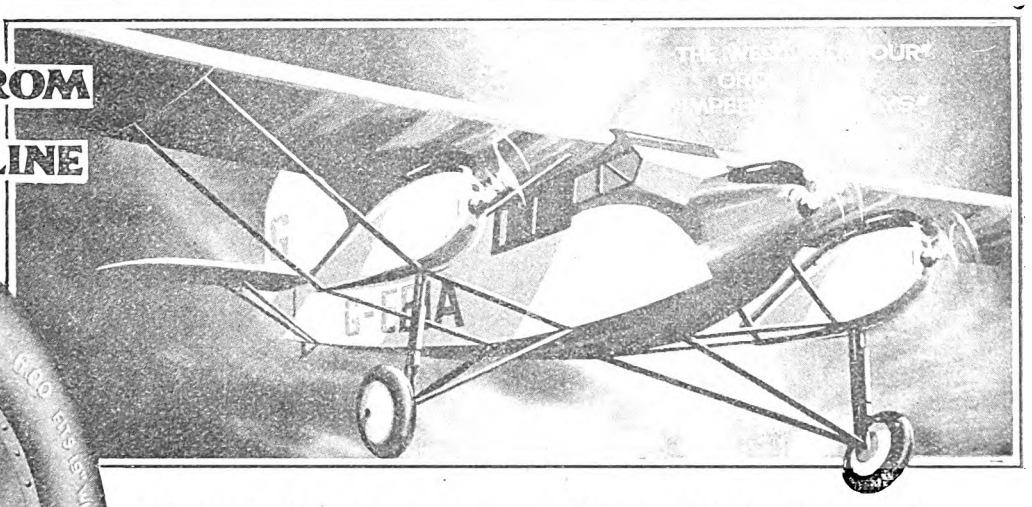

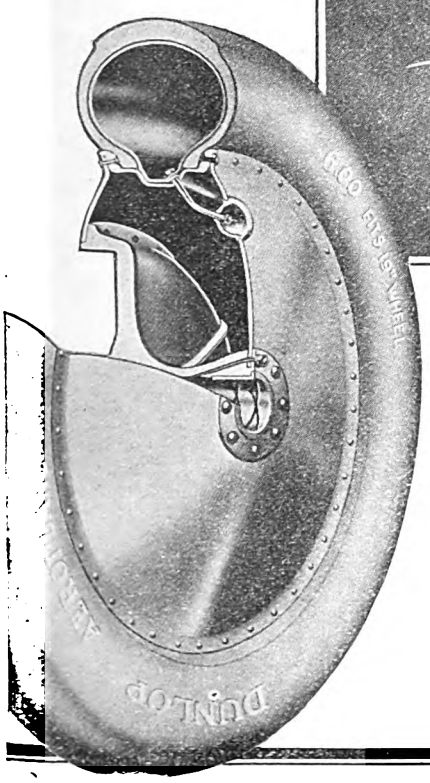

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Yet another triumph for CASTROL! On December 12th, a three-engined Fokker machine in the Sabena service, piloted by Chief Pilot Coquyt and Second Pilot Dubois, flew from the Belgian Capital to London, in 89 minutes, and what is still more amazing, *made the return trip in the level 80 minutes.*
The engines of this record-breaking machine were lubricated throughout with the record-breaking oil—Wakefield CASTROL.

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On December 17th, Capt. Costes and Lieut. Codos, flying a Breguet machine, established a new World's Record for a closed circuit course by flying 5060 miles 52 hours 37 minutes. The Hispano engine, lubricated throughout with Wakefield CASTROL, never once faltered during this gruelling test—a splendid tribute to a splendid oil!

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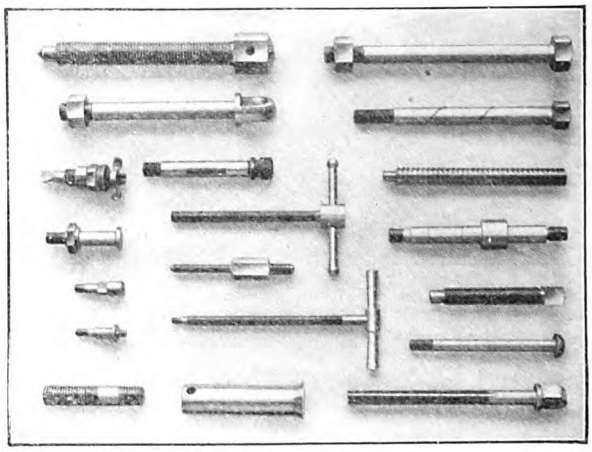

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DARLASTON, SOUTH STAFFS.

PHONE:—DARLASTON 130

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COMMERCIAL AERONAUTICS.

SIR ALAN COBHAM.

Sir Alan Cobham has handed over his Giant Moth *The Youth of Britain* to Mr. Wolley Dod, who will fly it to England when Imperial Airways have finished their present survey.

On Jan. 9 Sir Alan left Bulawayo for Johannesburg on his way to Cape Town.

BERLIN—ANGORA.

An agreement has been signed between the Turkish Government and Lufthansa for an air mail service between Berlin and Angora. The concession is for 20 years. The service will be opened in the Spring.

THE MANAGEMENT OF THE CIRRUS COMPANY.

Within the last week or so two Joint General Managers have been appointed to Cirrus Aero-Engines Ltd. Major Jack Stewart, late R.F.C. and R.A.F., who has for long been Sales Manager of the firm, and was with the Aircraft Disposal Co. Ltd. before that, is General Manager on the sales side. He is so well known and well liked in the Aircraft Industry here and all over the Continent of Europe that nothing more need be said of his career.

Mr. W. H. Peak, O.B.E., has been appointed General Manager on the production side. Until recently Mr. Peak was in the Marconi organisation, and has been Managing Director of the Sterling Telephone Co., the Relay Automatic Telephone Co., and the Marconiphone Co. During the War he was Financial Representative of the Treasury at the Munitions Factory at Gretna.

ENGLAND—INDIA.

Man Mohan Singh left Croydon on Jan. 11 to fly to India in an attempt to win the prize of £500 offered by the Aga Khan for the first Indian to fly to India. He landed in Kent on the way from Croydon. Then he landed at St. Inglevert the same afternoon and left for Paris on Jan. 12. He was forced down by bad weather at St. Quentin, but took off again

He landed near Noyon at 18.00 hrs. the same day. Reports state that he broke his airscrew on landing. He left Noyon for Le Bourget on Jan. 13 by motor-car. Noyon is in the straight line between Amiens and Reims.

He has called the machine *Miss India*.—It seems likely to.

CROYDON NOTES.

Mr. van Lear Black was at Croydon on Monday last, with Sir Sefton Brancker. Mr. Black expects his new tri-motor Fokker from Holland any day now, and is, in his own words, "all set" to get away as soon as possible to the uttermost ends of the earth with Tokyo as one of his first objectives. Messrs. Geysendorffer and Scholte will pilot Mr. Black as usual.

Our social column is full of notable names just at present.

Mr. Donald Drew has been seen about the place in a light Summer suiting, closely followed by Mr. Ernie Parker in an Uskub hat. This means they are going East with the swallows. They are taking a new Calcutta out East for Imperial Airways as far as Cairo.

Mr. "Jerry" Shaw of Shell has also torn himself away from the joys of Winter sports in England, which just now consists largely of tree jumping when doing 40 on a dark night along main roads, and submarining along flooded roads whilst breathing through the pores at the top of the head. Those who go right under and only come up twice lose ten points.

Mr. Shaw is going to Cairo and Khartum and then to certain parts of Darkest Africa, where he hopes to replace the local currency of cowrie shells by different sized tins of various grades of Shell petrol.

Rumour hath it that Jerry is on the trail of certain hitherto undiscovered oil-wells, but it is supposed that Tommy Pratkins got there first and soaked otherwise virgin plots of ground with sardine oil. When Jerry starts boring, he will be disappointed, not to say bored.

Flt. Lt. Wilson has just returned from Pisa, where he is understood to have added a certain tone and lustre to the Royal Wedding.

Mr. Koolhoven reached our shores recently (by which the edge of the Croydon Tarmac is meant) and it is supposed that he has come over here to clink a jovial loving cup with Mr. Desoutter.

Even the humble Spry, afoot as befits his station, has been on holiday in Sussex, where he has been footslogging with Mr. Charles Dickson, the artist, to the astonishment of the native population, from Burwash to Beachy Head.

Certain footless slubberdy-gullions who talk too much and walk too little, made bold to jeer at Spry's tales of twenty miles a day, preferring to regard twenty pints a day as nearer the mark. A Fico for such doddipole jolt-heads. May their beer lie uneasily in queasy stomachs.

Mr. George Young, who has been Station Engineer at Croydon for K.L.M. ever since K.L.M. came into being, is justly proud of his year's record for freedom from engine trouble on outward bound aircraft. From Jan. 1, 1929, to Dec. 31, 1929, 732 K.L.M. machines were signed out of Croydon, and of these only one did not complete the journey the same day. Two others returned to Croydon with minor trouble, and were despatched again immediately, and one more made a brief forced landing at Ostend and proceeded after changing a plug.

The outward percentage is therefore 99.6. Which Mr. Young softly suggests will take a bit of beating.

It is not often that an aerodrome goes a-missing, but on an Air Ministry weather report of 10.1.30, Le Bourget was scheduled as missing. Although fears were felt for its safety, and it was suggested that it should be broadcast for as "Missing from its home on 10th January, wearing a light coloured Control Tower, a dun-coloured Douane and all the usual offices. Any information as to its whereabouts should be communicated to the Commissioner of Police," etc., fortunately Le Bourget turned up smiling before the broadcast became necessary.—SPRY.

THE LONDON TERMINAL AERODROME.

ANALYSIS OF FIGURES FOR PAST WEEK.

Trips per Day.—Sunday, 7; Monday, 15; Tuesday, 15; Wednesday, 16; Thursday, 19; Friday, 18; Saturday, 18.

IMPERIAL AIRWAYS LTD.:
London—Egypt—India: London—Le Touquet—Paris—Basle—Zurich: London—Ostend—Brussels—Cologne and return: Machines 35, passengers 243, freight 12¼ tons. India Route: Inward, passengers 0, mail 0 lbs.; outward, passengers 0, mail 758 lbs.

AIR UNION:
Paris—London: Machines 34, passengers 90, freight 7½ tons.

K.L.M.:
Amsterdam—Rotterdam—London: Machines 12, passengers 19, freight 6 tons.

SABENA:
Brussels—London: Machines 12, passengers 21, freight 2¾ tons.

DEUTSCHE LUFT HANSA A.G.:
Amsterdam—London: Machines 12, passengers 16, freight 2¾ tons.

MISCELLANEOUS:
British machines 3, passengers 0.
Foreign machines 0, passengers 0.
Total number of trips by British machines, 138, carrying 243 passengers. Foreign machines, 70, carrying 146 passengers.

COMPARATIVE FIGURES.

Week ending Jan. 11:
Machines, 108; Passengers, 389; Crews, 293; Total personnel, 682.
Corresponding week, 1929:
Machines, 72; Passengers, 217; Crews, 143; Total personnel, 360.
Corresponding week, 1928:
Machines, 94; Passengers, 238; Crews, 160; Total personnel, 398.
Corresponding week, 1927:
Machines, 67; Passengers, 176; Crews, 108; Total personnel, 284.
Corresponding week, 1926:
Machines, 44; Passengers, 125; Crews, 54; Total personnel, 179.
Corresponding week, 1925:
Machines, 16; Passengers, 17; Crews, 16; Total personnel, 33.
Corresponding week, 1924:
Machines, 45; Passengers, 66; Crews, 70; Total personnel, 136.
Corresponding week, 1923:
Machines, 36; Passengers, 79; Crews, 63; Total personnel, 142.
Corresponding week, 1922:
Machines, 14; Passengers, 14; Crews, 21; Total personnel, 35.
Corresponding week, 1921:
Machines, 15; Passengers, 12; Crews, 17; Total personnel, 29.

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MR. ALFRED ERNEST OWEN.

The death occurred on Jan. 6 at Sutton Coldfield, of Mr. Alfred Ernest Owen, the sole proprietor of the well-known firm of Rubery, Owen and Company, Constructional Engineers and Manufacturers, of Darlaston, Staffordshire, a firm whose manufacture of aeroplane components and accessories has been of such value to the British Aircraft Industry.

When Mr. Owen joined the late Mr. Rubery in the business in 1893 the works covered about half an acre and there were only 29 employees. To-day the works cover fifty acres and there are 2,000 employees.

Mr. Owen was the proprietor of H. M. Joel and Co., of Sheffield, in addition to being the proprietor of Rubery, Owen and Co., and was also Director of a number of other Companies concerned with engineering. He was a member of the Royal Aeronautical Society, of the Royal Society of Arts and of the Institute of Structural Engineers.

Mr. Owen leaves two sons, both of whom he hoped would follow him in the business. The elder is 21 years of age, and still at Cambridge.

All old-timers in the Aircraft Industry will deeply regret his death, for Mr. Owen was a good friend to the Trade in its early days. He was the first manufacturer and manipulator of steel products to see the possibilities of the aircraft business, and from the earliest days of flying he laid himself out to supply what this new market needed.

Personally, one has corresponded with Mr. Owen for fully twenty years, and in all that time he has seemed to one as a model of what a farsighted and enterprising British manufacturer should be. By his death England has lost a man of sterling worth.—C. G. G.

PERSONAL NOTICES.

DEATHS.

CHILMAN.—On Jan. 8, at Abu Sueir, Egypt, as the result of a flying accident, Cpl. William Henry Chilman, R.A.F.

GALPIN.—On Jan. 8, at Abu Sueir, Egypt, as the result of a flying accident, Charles Edson Galpin, Flg. Off., R.A.F.

Mr. C. E. Galpin entered the Royal Air Force with a short-service commission in July, 1924, and underwent a course of flying training at No. 2 F.T.S., Digby. In June, 1925, he was posted to No. 17 (Fighter) Squadron, then at Hawkinge. In 1926 he was promoted to Flying Officer and posted to the staff of No. 1 School of Technical Training (Apprentices), Halton. In September, 1927, he was posted to No. 502 (Ulster) Squadron. In September, 1929, he was posted to No. 4 Flying Training School for Air Pilotage duties.

GREEN.—On Jan. 8, at Abu Sueir, Egypt, as the result of a flying accident, L-AC. Leonard Vincent Green, R.A.F.

GREENSLADE.—On Jan. 8, at Abu Sueir, Egypt, as the result of a flying accident, Flt. Lt. Richard Samuel Greenslade, R.A.F.

Flt. Lt. Greenslade was born in 1894 at Pitminster, Somerset, and was educated at Queen's College, Thornton, and at Sherborne. On the outbreak of War in 1914 he joined the Royal Horse Artillery (Somerset Territorial Force) and in September, 1915, he was given a temporary commission in the Machine Gun Corps. In August, 1917, he was attached to the Royal Flying Corps as a Flying Officer and two months later he was made a prisoner of war.

In September, 1919, he was given a short-service commission in the R.A.F. as an Observer Officer. He was posted to No. 31 Squadron at Ambala in the summer of 1919 and on his return to the Home Establishment he underwent a course at the School of Balloon Training at Larkhill. In June, 1921, he was posted to the Special Duty Flight at Oranmore of No. 100 Squadron, then part of the Irish Wing. In 1922 he was posted to the staff of No. 1 School of Technical Training (Boys), at Halton, and the following year joined the staff of No. 5 Flying Training School, Sealand. In September, 1925, he was posted to the R.A.F. Cadet College, Cranwell, for Engineering duties.

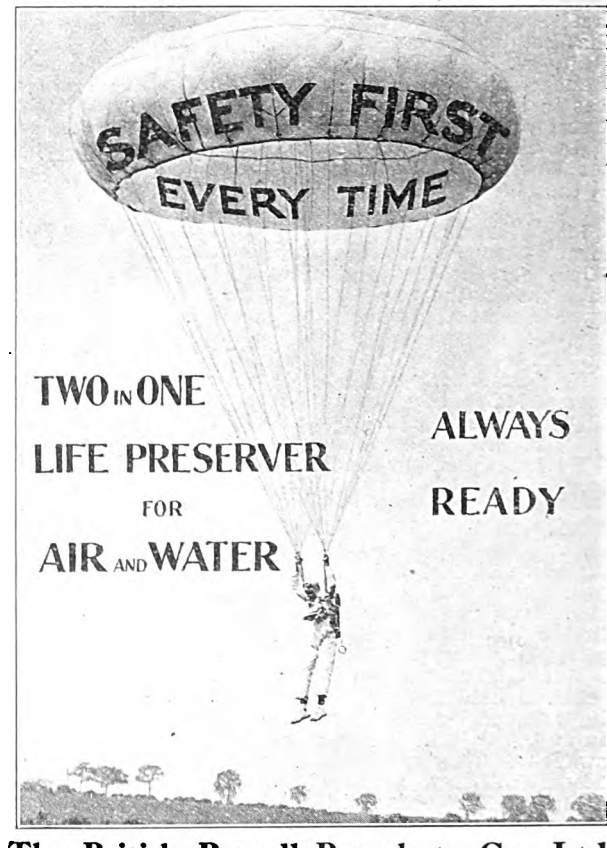
He was promoted Flight Lieutenant in July, 1926, and granted a permanent commission in November 1927. In September, 1927, he was posted to No. 4 Flying Training School, Abu Sueir, Egypt.

Flt. Lt. Greenslade was a distinguished marksman. While at Abu Sueir he was the Captain of No. 4 F.T.S. Shooting Team which won the Egypt and Sudan Shooting Trophy two years in succession.

MARRIAGES.

BAIRSTOW—STEPHENS.—On Jan. 7, at the Cathedral, Llandaff, Glamorgan, Professor Leonard Bairstow, C.B.E., F.R.S., of Wimbledon, to Florence Katharine Stephens, eldest daughter of Mr. D. J. Stephens, of Llandaff, and of the late Mrs. Stephens.

DAVID—MACKENZIE.—The marriage took place on Jan. 9, at Holy Trinity, Brompton, of Flt. Lt. Hugh Markham David, second son of Lieut.-Col. M. David and Mrs. David, of Warwick Mansions, Cromwell Crescent, S.W., and Miss Geraldine Fassefern (Jill) Mackenzie, youngest daughter of the late the Rev. Angus Cameron Mackenzie, of Dundee, and Mrs. Cameron Mackenzie, of St. Petersburgh Place, W.



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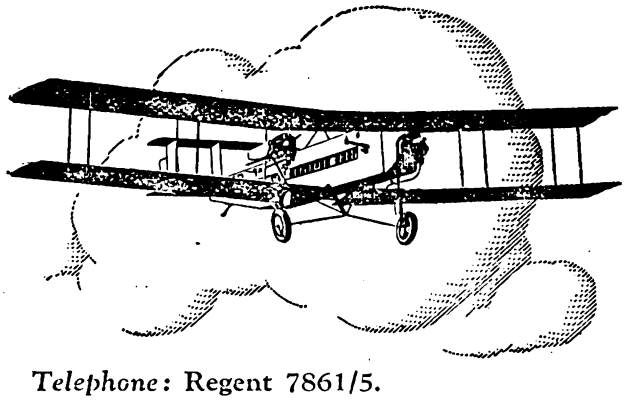

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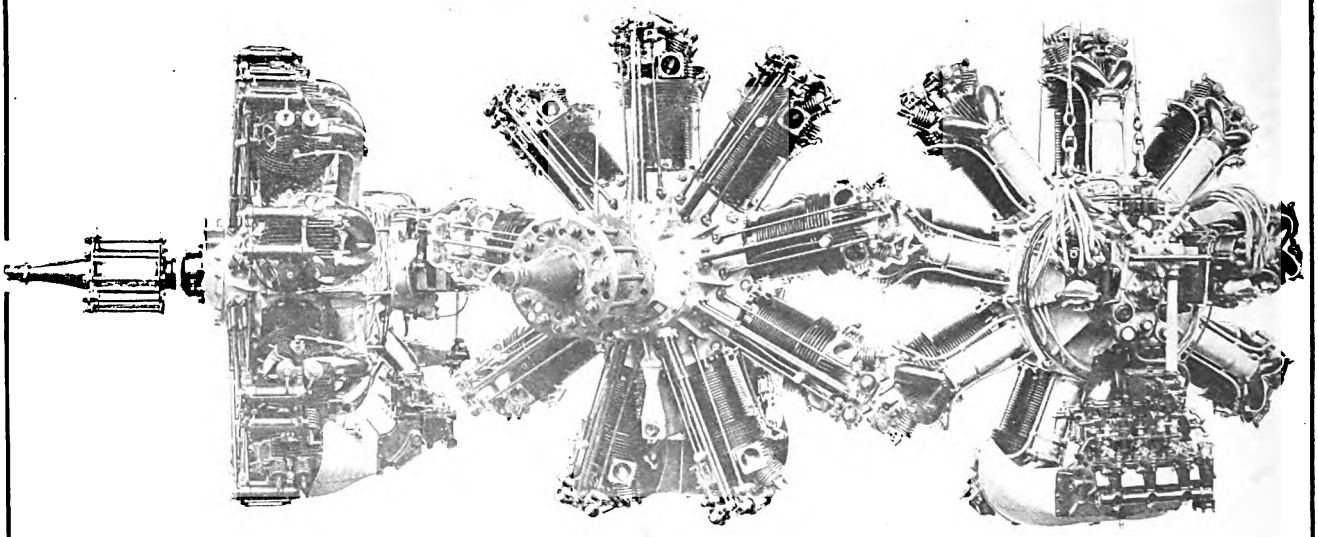

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ON BRITISH PROGRESS IN 1929.—IV.

AERO ENGINES.—II.

This week we go on with our review of British progress in aero-engines in 1929, and discuss those which come into the latter part of the alphabet. Here, as in the earlier articles, there is eminently satisfactory work, and, what is still more important, a most encouraging outlook, to record.

The De Havilland Aircraft Co. Ltd.

The De Havilland Aircraft Company founded by Capt. Geoffrey de Havilland soon after the end of the War 1914-18, and already famous all over the World because of the aircraft designed by Capt. de Havilland before and during the War, for the Aircraft Manufacturing Co. Ltd., founded by that great pioneer the late George Holt Thomas, came into the aero-engine business late in 1927.

During 1928 the Gipsy engine was still more or less in its experimental stages, but it has needed less experimenting than probably any other aero-engine ever produced, because of the experience combined in it. The Gipsy engine, in fact, represents the latest product, so far as the public at present is concerned, of the fertile brain of Major F. C. Halford, who first became known through the B.H.P. engine, afterwards through the Siddeley Puma, and later as the designer of the Cirrus engine. Major Halford worked in close co-operation with Capt. de Havilland and designed the engine specially to suit the De Havilland Moth aeroplane.

Actually the first experimental Gipsy engine produced was designed to develop 135 h.p. at a very high rate of revolution. One of these first engines was put into the De Havilland Tiger Moth, a small single-seat monoplane, which was built round Mr. Hubert Broad,—a physical fact which is interesting and amusing.

In this small machine Mr. Broad put up the World's Speed Record for light aeroplanes, which still stands at 186 m.p.h. As the course covered 100 kilometres (50 out and 50 home), and included turning and finding the course in a bad light, there is no doubt that actually on the straight that small machine put up a speed of 200 m.p.h.

That was a fine introduction to the World for the Gipsy engine. But the De Havilland Company wisely did not continue to extract such abnormal power from such a small engine. Therefore they de-tuned it, reduced the revolutions, and the compression, and fitted smaller valves, with the result that with the same bearing surfaces and major components, the engine is able to stand up to any ordinary use for an indefinite time. It is now rated at 110 h.p.

During 1929 the Gipsy engine has had an amazing record. It has been fitted into every Gipsy-Moth which has been turned out during the year, and there has hardly been a complaint of any kind about the engine. Also it has been fitted into the aeroplanes of rival aircraft makers, such as the Avian, the Widgeon, and the Blue Bird, among English aeroplanes, and it has also been fitted in the Curtiss-Reid Rambler, and in the Netherlands Pander monoplane, the Italian Caproni and the German Albatros. In all these it has done equally good service.

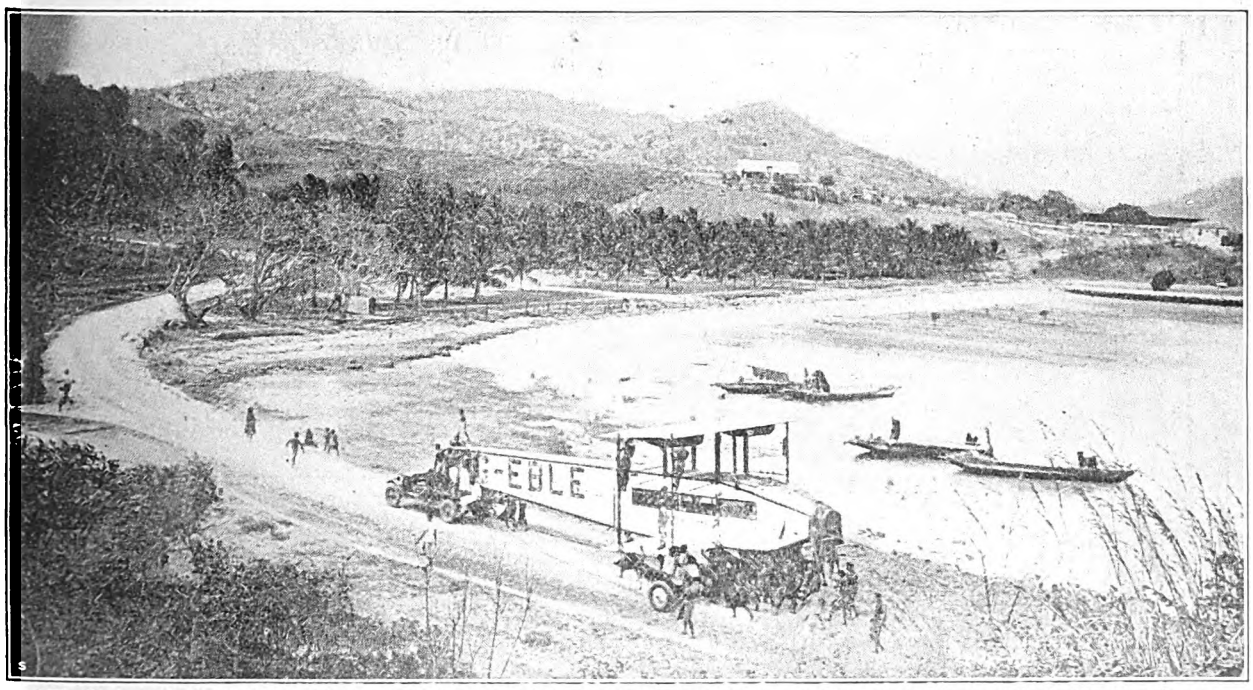
Among the most remarkable achievements of any aero engine during the year has been that put up by a Gipsy engine in a Gipsy-Moth which was sent on a reliability test with all the replaceable parts of the engine sealed by the officials of the Aeronautical Inspection Department of the Air Ministry.

Without having to replace any of these sealed parts, this machine flew, handled by different pilots, for six hundred hours before the engine was taken down for inspection.

That represented, at the speed at which the machine was flown, a distance of about 51,000 miles. If any motor car engine has ever covered as much as 50,000 miles without overhaul one would like to hear of it. But here we have, even thus early in the development of aviation, an engine which has definitely covered such a distance under official observation without a replacement of any kind.

Apart from this the Gipsy engine in Moths and other

"EXAMPLE IS A LESSON THAT ALL MEN CAN READ."
(Gilbert West).



AIR TRANSPORT OVERSEAS.—A Handley Page biplane, bought from Imperial Airways Ltd. for the transport of gold from and stores to the mines at Wau belonging to New Guinea Goldfields Ltd. The journey by air takes 25 minutes, and by land some weeks. The machine is here seen being taken from the dock at Port Moresby, to be assembled and flown to Salamoa.

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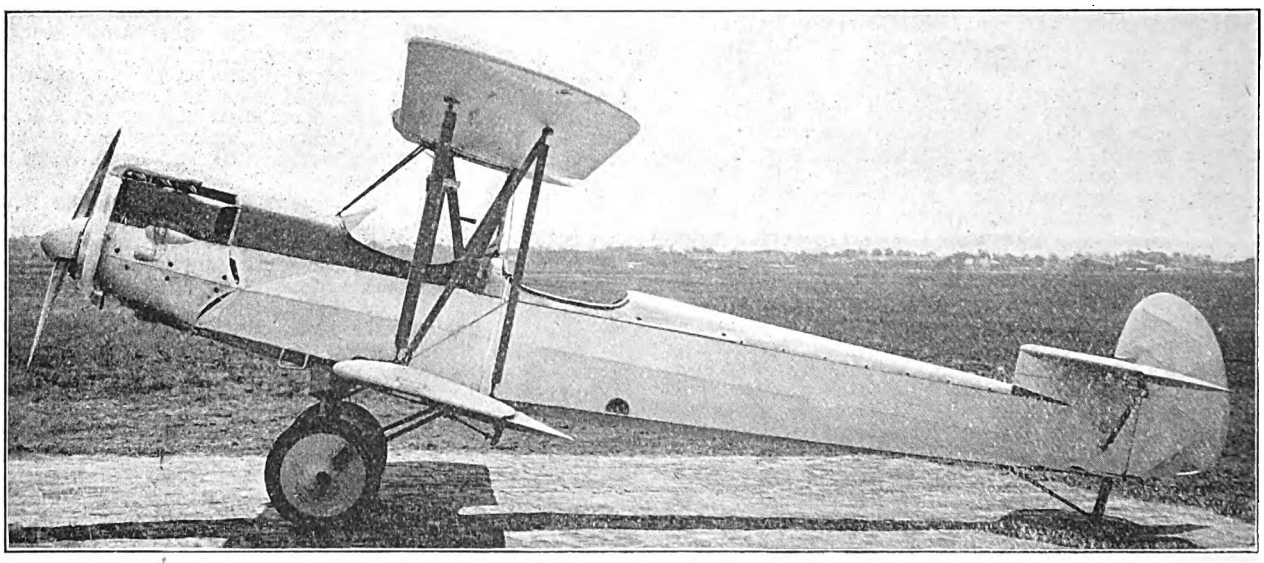
FOREIGN TRADE.—The Netherlands Pander, type P.—Gipsy engine.



FOREIGN TRADE.—The German Albatros L.82.—Gipsy engine.

FOREIGN TRADE.—The Italian Caproni.—Gipsy engine.

aircraft has won the majority of the important light aeroplane competitions during 1929. On the Continent Mr. Broad was first in the higher category for light aeroplanes in the Tour of Europe, and he also won the much-coveted Zenith Cup in France.

The latest Gipsy engine is inverted with the cylinders below the crank-case. The result is that, when it is fitted into any normal type of tractor aeroplane, the pilot has a clear view along the crank-case, instead of having a block of cylinders sticking up in front of his eyes and compelling him to look out sideways for a view ahead.

The latest type of Moth, known as the Mark III, or Puss-Moth, has this engine, and those who have flown it say that it gives the pilot an entirely new outlook on aviation. So perfect is the view ahead, and downwards in front, that one might almost be flying a machine with the engine at the back.

The Gipsy engine is, in fact, a worthy companion to the Moth aeroplane. Between them they represent the greatest contribution to the development of Civil Aviation within the Empire that has been produced by any one firm since Civil Aviation began. Altogether over a thousand Moths

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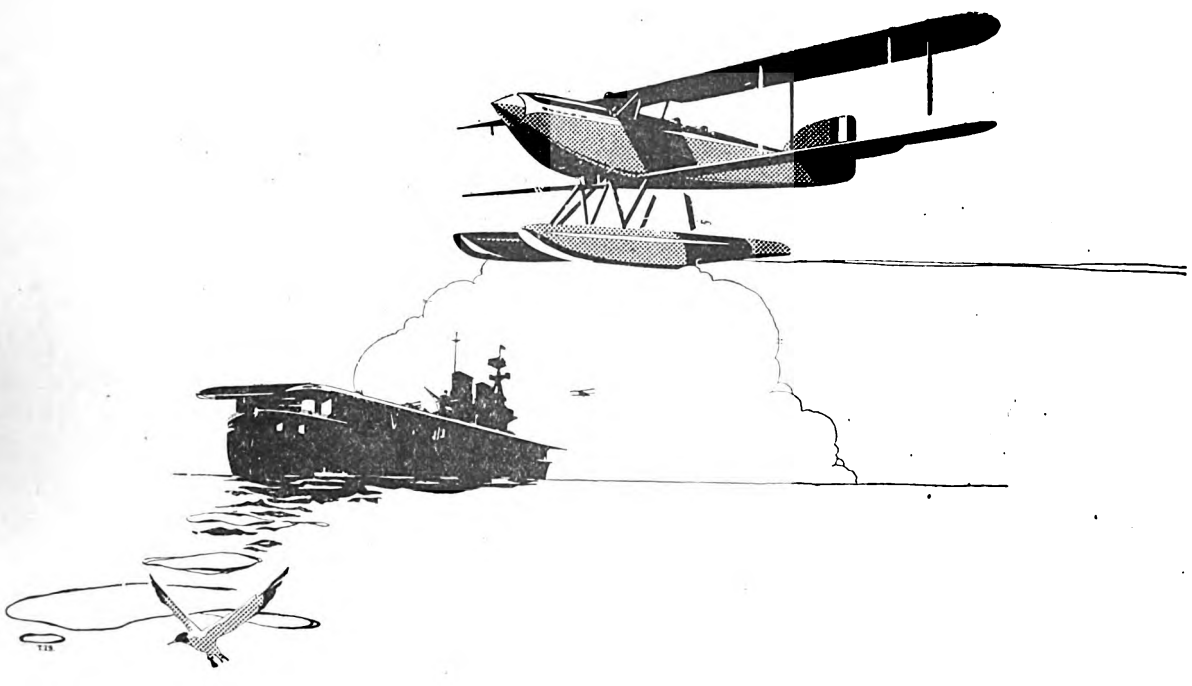

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UNRIVALLED ACHIEVEMENTS

Air

The greatest formation flight ever carried out was made with four Supermarine-Napier Southampton flying-boats, each fitted with two Napier engines. The machines flew from England to Australia, round Australia and back to Singapore, covering 180,800 engine miles without mechanical trouble.

The first non-stop flight from England to India was carried out with a Fairey monoplane fitted with Napier engine. 4,130 miles in 50 hrs. 38 mins.

Land

The highest speed ever attained on land was made by Major Sir Henry Segrave when he drove his Irving-Napier car over one mile at the amazing speed of 231.36 m.p.h.

Capt. Malcolm Campbell set up world's land speed records at Verneuk Pan with his Napier Arrol-Aster as follows :—over 5 miles, speed 211 m.p.h.; over 5 kilometres, speed 216.53 m.p.h.

They both used Napier engines.

Water

The world's motor-boat speed championship was won at Miami by Major Sir Henry Segrave, driving Sir Charles Wakefield's Napier-engined "Miss England."

Sir Henry Segrave at the Lido with the same boat made six runs over the measured mile, averaging a speed of 92.8 m.p.h.

At this meeting, competing against the best from Italy and America, Sir Henry Segrave won all trophies, including the Duke of Piedmont's cup and Count Volpi's cup.

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Extract from "The Times" "Review of the Year," 1st Jan., 1930 :

"Lady Bailey completed in January a remarkable air tour of some 18,000 miles from England to Cape Town and back by the West Coast route."

Lady Bailey flew a CIRRUS engined Moth.

Extract from a letter from a South African engineer, 18th Dec., 1929 :

"Probably the greatest test an engine ever passed through was Squadron Leader Hinkler's 15½ days' flight from England to Australia."

Squadron Leader Hinkler flew a CIRRUS engined Avian.

Extract from a letter from Mr. J. E. Carberry, 24th Aug., 1929 :

"With reference to my participation in the Challenge de Tourisme Internationale with my CIRRUS HERMES engined machine, and in which I was successful in returning the fastest time over the course of approximately 4,000 miles round Europe, I wish to take this early opportunity of congratulating you upon the remarkably efficient running that was given by the engine throughout the race.

Mr. Carberry flew a HERMES engined R.K.25.

Extract from a letter from Lieut. R. R. Bentley, 27th Aug., 1929 :

"On completion of the second round trip : London—South Africa—London, I have nothing but praise to offer for CIRRUS Engine No. 85 Mod/III, which has thus completed, with the utmost reliability, an air mileage of something over 50,000."

Lieut. Bentley flew a CIRRUS engined Moth.

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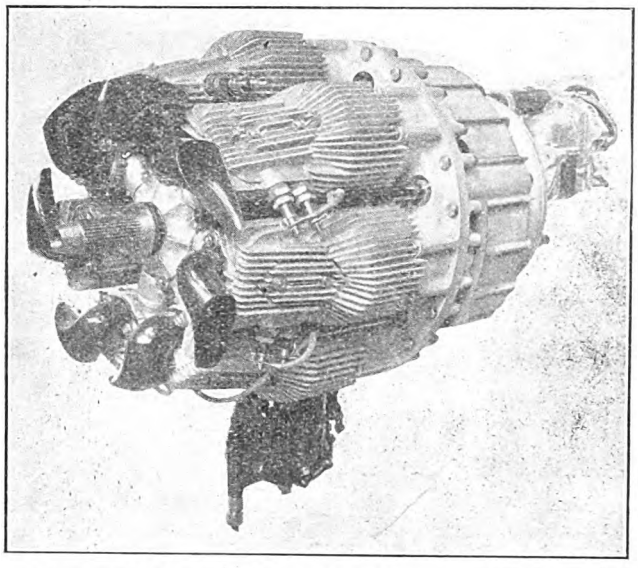


THE POWER-BARREL.—The Redrup Lever engine.

In this type of engine, the cylinders, of which there are seven in this particular engine, are arranged with the stroke parallel to the crank-shaft, or the airscrew-shaft, of the engine instead of radially or in line at right angles to it.

Instead of working on an ordinary crankshaft, the big-end bearing is mounted on a Z-shaped shaft and carries seven levers projecting from it. To the end of each lever is attached a connecting-rod from one of the seven pistons. The pistons and cylinders work just as do any ordinary piston and cylinder of any internal combustion engine. But the explosion driving the piston forward pushes the particular lever connected with it and the pressure of this lever drives the main crank-bearing round. It is quite a simple thing to understand when one has seen it. though it is a trifle difficult to describe in words or to show on paper.

The experimental engines have not as yet passed the Air Ministry type-test, but at the time of writing an engine is being prepared for that purpose.

The moving spirit of the Syndicate is Mr. M. L. Bramson, who has long been well known in British aviation, and the job of putting the engine through the shops is in the hands of Squadron Leader de Haga Haig, who is now as well known in Civil Aviation as he was when he was one of the most skilful of the test pilots of the R.A.F. With two such experienced engineers and aviators in charge of the job, there is every reason to expect success for the Redrup-Lever engine.

Rolls-Royce Ltd.

In all walks of life the name Rolls-Royce stands for the highest possible quality of material and workmanship. That reputation has been built up by the Rolls-Royce car and it has been worthily upheld by Rolls-Royce aero-engines. There has never been a bad Rolls-Royce engine, but some have been better than others.

The only criticism to which the early Rolls-Royce aero-engines were subject was that they were so terribly complicated. The complications were in the use of innumerable screws and in the use of several parts where one piece of metal could have done the work. Undoubtedly Mr. Royce, who was largely responsible for this design, had good arguments on his side. The more separate pieces you have in a mechanism of this kind, the less likely you are to be put out of action by a flaw in one big piece of metal on which you have to depend. And that was good reasoning in time of war when material was not so dependable as it might have been.

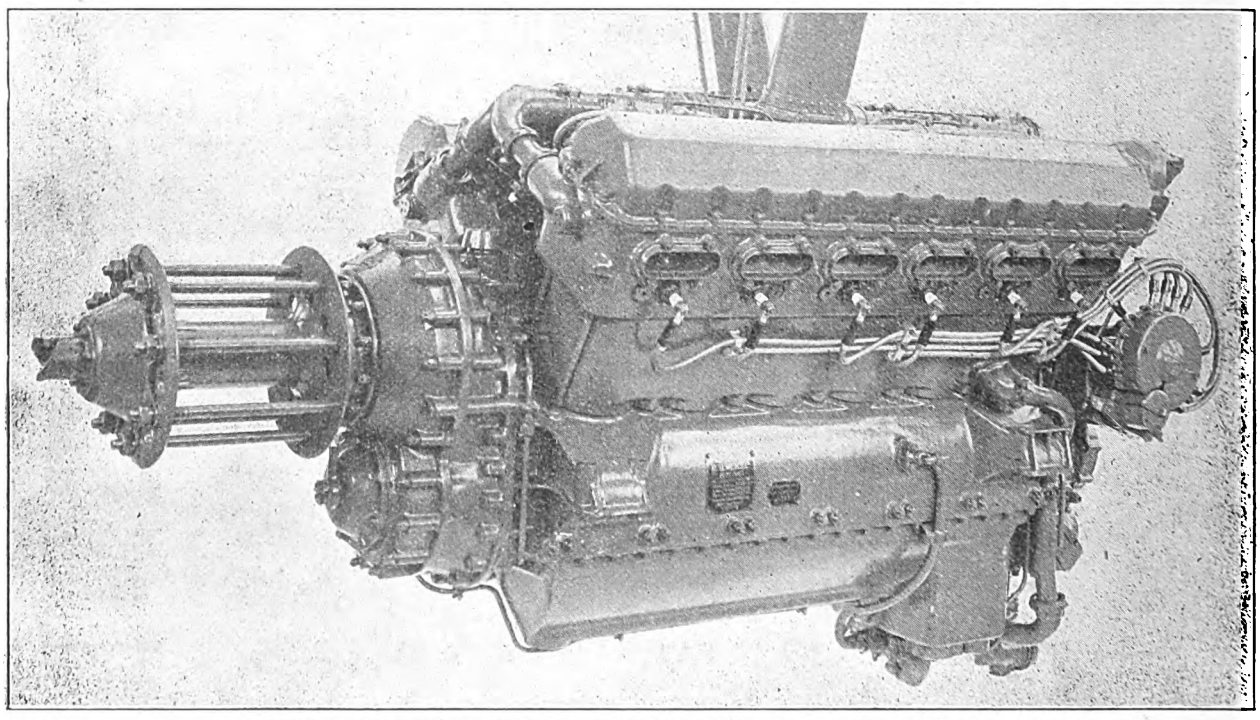
Be that as it may, the Rolls-Royce F type of to-day is just about as simple as can be. It is a straightforward 12-cylinder V-type engine with two cylinder blocks of six cylinders each. The carburettors, instead of hanging down behind the engine on long pipes with consequent uncertain mixture at low speeds, as used to be considered necessary by the Air Ministry's technicians, are now tucked neatly in between the cylinder-blocks. The driving shafts for magnetos and cam-shafts are all stowed away nicely at the back of the engine along with the magnetos. In fact, the whole engine is surprisingly compact for such high power. Which accounts for the low head-resistance and high performance of all machines in which it is used.

The F type engine has been used successfully during 1929 in a number of R.A.F. machines and towards the latter part of the year, that is to say at the Aero Show in July, it appeared in two single-seat fighters, the Fairey Firefly and the Hawker Hornet, each of which is claimed to be the fastest fighting machine in the world. Their performance figures are not yet made known, but according to well-founded rumours they both do well over 220 m.p.h. at fighting height.

From the F type engine has been developed the H type engine which gives 825 h.p. as against the 480/490 h.p. of the F type engine.

From the H type engine has been developed again the R type engine, which was used in the winning machine in the Schneider Trophy contest. What power that engine gave is unknown to any but the inner technical circles of the Air Ministry and of the Rolls-Royce firm. A technical expert from another country, knowing the speed of the machine and its weight, calculated that the R engine in the race gave approximately 1,950 h.p. On the other hand a technical expert in this country, who should be in a position to know, says that the R engine has given 2,200 h.p. on test. Probably the truth is anywhere around those figures and so the R type may be regarded as a 2,000 h.p. engine.

To get anything like that power out of an engine of that



POWER AND RELIABILITY.—The 480/490 h.p. Rolls-Royce F-type engine.

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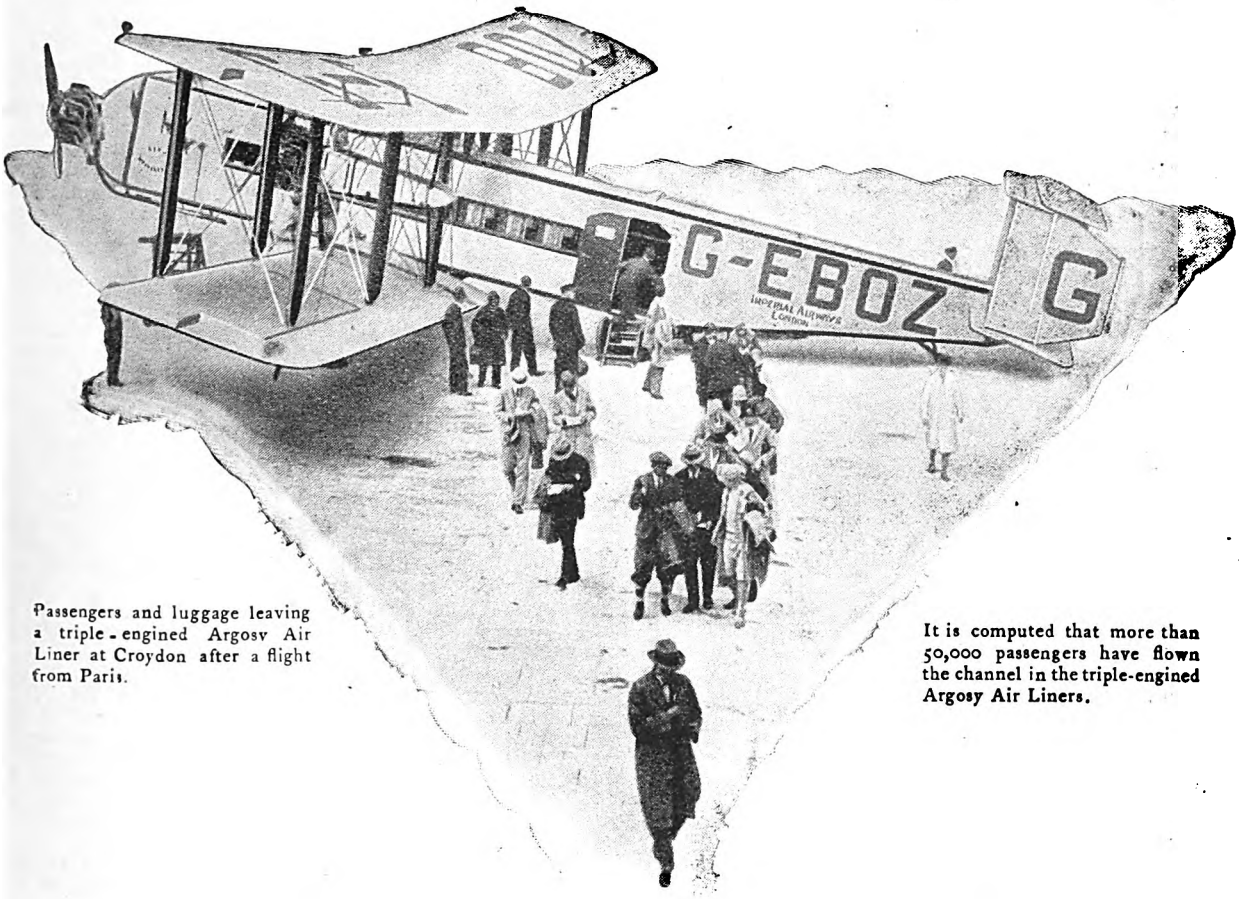

Passengers and luggage leaving a triple-engined Argosy Air Liner at Croydon after a flight from Paris.

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Approximate number of Channel Crossings to 31st October. 1929 - - - - -	3,750.
Number of hours flown - - - - - - -	10,118.

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Works and Aerodrome: Whitley, nr. Coventry. London: 10, Old Bond Street, W.1.

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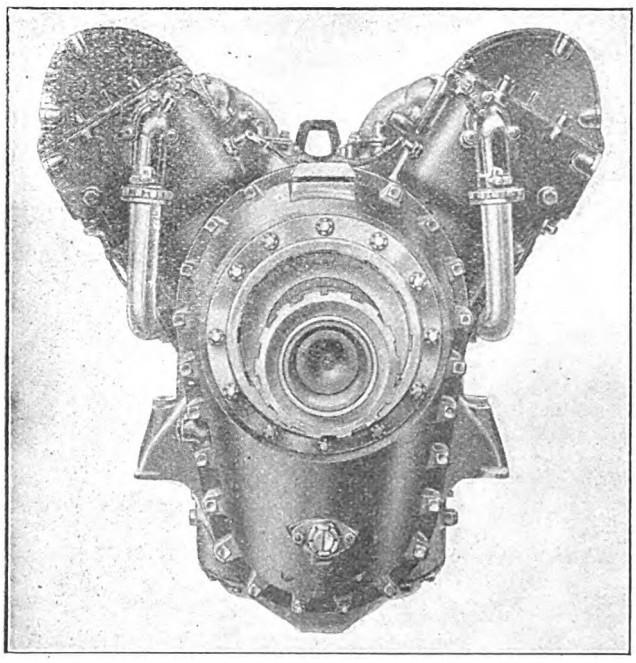

DRAG REDUCTION.—The "R" engine, end view.

size is quite one of the most remarkable engineering achievements of this or any other age. It means that in any event we are getting 1 h.p. out of less than 1 lb. of metal and other material in the engine.

Not many years ago five pounds per h.p. was regarded as something for which to aim in the distant future. Three or four years ago we spoke guardedly of the possibilities of two pounds per h.p. And now the Rolls-Royce has brought it down to less than one pound per h.p. This may be certainly regarded as a worthy contribution to British progress in 1929. For it Mr. F. H. Rolls and Mr. E. W. Rowledge deserve the thanks of the Nation.

The British Salmson Engine Co. Ltd.

Although the French Salmson engine (*Système Canton-Unné*) was well known in England before the outbreak of war in 1914, and though Salmson engines built in France were used considerably in British aircraft, especially in seaplanes, during the War 1914-18, we have seen little of the Salmson engine since then, until quite a few years ago the Salmson firm produced a very small nine-cylinder radial air-cooled engine of 40 h.p. Before that time the firm had made big and small radial water-cooled engines, and they had also made a certain number of radial air-cooled engines, but without achieving any outstanding success.

For some curious reason with the success of the tiny 40 h.p. Salmson, the larger air-cooled radial also began to succeed. In fact, the nine-cylinder 120 h.p. Salmson and the nine-cylinder 230 h.p. Salmson engines have been among the most successful French air-cooled radial engines during 1929. Apart from that fact, a German monoplane with a 40 h.p. Salmson engine won the first prize in the general category and in the lower category in the International Tour of Europe for light aeroplanes. Also several remarkable long voyages, for example from France to Madagascar and back and from France to Indo-China and back, have been done in French machines with the bigger Salmson engine.

Towards the end of 1929 Monsieur Bovier of the British Salmson Company, a firm which had been making Salmson motor cars in this country for quite a considerable time, in conjunction with Mr. F. W. Berwick, one of the Directors of the Firm, started to produce Salmson aero-engines in this country. This undertaking is of considerable interest.

Those who were at all interested in the production of aero engines during the War 1914-18 will remember Mr. Berwick as turning out enormous quantities of very good Le Rhône engines from his works. And among them none were better than those built up of parts produced by M. Bovier, who, in his own works, discovered himself as one of the most remarkable production-engineers of the war. He has an amazing faculty for producing quantities of work and yet being able to maintain its quality. So the combination of Mr. Berwick and M. Bovier in the production of aero-engines is likely to be for the benefit of everybody concerned.

Their first engines are not yet ready, although work has begun in the aero-engine shops. But they expect to have their engines on the market within six months, and possibly not long after the end of March. Naturally the British Salmson engine will have to pass the Air Ministry type-test before they can be used in British aircraft, but having all the experience of the French Salmson firm on which to work, and with his own unusual facilities, M. Bovier should have no difficulty in getting his engines through.

Thus, as has so often happened in British Industries of all kinds, our own industry is likely to benefit by the importation to this country of fresh ideas from abroad. In this particular instance we have the consolation that the men employed in the works, and the people at the head of the firm and the money invested in it are British, for M. Bovier has lived in this country so long that he should now count as one of ourselves.

Morris Motors Ltd.

By this time everybody connected with Aviation knows for certain that Sir William Morris, the World-famous producer of the Morris Oxford and Morris Cowley cars and Morris Commercial vehicles and Morris agricultural vehicles, is producing an aero engine. Whether it will be sold by Morris Motors Ltd., or whether it will be sold by a separate Morris firm, whether it will be called the Morris engine or whether it will be called by some fancy name, nobody at present is able to say definitely,—unless it be Sir William Morris himself. The only thing that one can say at the present time about it is that work on it has definitely begun.

A number of interesting experiments, some of quite a revolutionary nature, have been made in various methods of doing things which in some engines are done by other methods which by now have come to be regarded as unalterable. Certain materials for the engine have been put into production, and the general design of the engine as a whole is completed. So it may be reckoned among British aeronautical progress of 1929.

Naturally there are those who hold that Sir William Morris and his technical people do not yet realise what they will be up against when they come to extracting airworthiness certificates from the Air Ministry's technical people. Those who know Morris methods best are the least anxious on this score. There can be no doubt about either the material or the workmanship which will be put into the Morris engine and those who are responsible for the design of the engine are not likely to make many mistakes. Therefore the Morris engine will probably pass the type-test without trouble.

Nothing yet is known about the type or power of the engine, but the most popular of the many rumours about it, and the rumour which comes from the most likely sources, says that the engine is to be an air-cooled radial of about 150 h.p. That strikes one as being a very useful line. This could be put on the market at a low price which should be quite applicable to a number of light or lightish aeroplanes of a type which should be very popular. With that power a three-seat, or even a four-seat, cabin monoplane, or cabin biplane as a matter of fact, could very well be produced at a price within the reach of almost anybody who at the present time can afford a first-class private aeroplane.

In any case we may expect to see the Morris aero-engine on the market within the next four to six months and its appearance will be watched with great interest.

The Sunbeam Motor Car Co. Ltd.

The Sunbeam Company was famous during the War for the number of engines they made and for the fact that shortly after the end of the War the British airship R 34 with Sunbeam engines made the first airship voyage across the Atlantic, as well as making the first out and home voyage across the Atlantic. Since then the Sunbeam firm have been experimenting quietly with aero-engines, but none of their output has been used in Service or civil aircraft.

During 1929 the fact became known that the Sunbeam firm was experimenting with a compression engine known as the C I type. This is a six-cylinder in-line vertical water-cooled engine. Normally it is supposed to give 104 h.p. And its weight is said to be 435 lbs.

Little is known about the engine, but one believes that it has run on the test-bench. Certainly so far it has not flown. Nevertheless, the engine is of great interest, for the tendency of to-day is towards compression-ignition engines using heavy oil, and without the trouble of electrical gadgets.

Mr. Louis Coatalen, the chief engineer of the Sunbeam Co., has long been known as one of the most ingenious automobile engineers in the World. Sunbeam racing cars have won quite a number of great international events, and Sunbeam touring cars have for many years been among the fastest and the smartest on the road. That being so, anything that Mr. Coatalen undertakes in the design of internal-combustion engines must always be taken seriously. One can only hope that very soon his compression-ignition engine may make a public appearance with success.

Engines on this system have flown in German aircraft

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WORLD'S RECORD WITH A GENET ENGINE

2670 km. (1,660 miles) in a straight line by Pilot Zimberly on a Barling N.B.3 fitted with an 80-88 h.p. Armstrong Siddeley Genet, at Brownsville, United States. (Light Aircraft Class 3.)

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and American Aircraft, but they are far from being airworthy as yet. Also British-built compression-ignition engines have worked, with moderate success, in a British airship,—to wit the R.101. But so far we have not had successful compression-ignition engines in British aeroplanes. So here is Mr. Coatalen's opportunity.

Finis.

That ends our list of British aero-engines. Taking it all round it is a list of which we may reasonably be proud. We have produced the most powerful engine for its weight in the World and with it we have captured the World's Speed Record. That alone is something to put British aero-engines in front of the rest of the world.

Over and above that we have produced radial air-cooled engines of high power which have been sold to more foreign nations, or alternatively are being made under licence by more foreign nations, than has any other country.

Furthermore, we have produced the most successful engines for light aeroplanes. These engines themselves are not amazingly light, but they have proved themselves so reliable and so economical in their petrol consumption that they have put us ahead of the World in this particular line of business.

The reliability of all our engines is their outstanding and most important characteristic. Because of that reliability men and women, experienced and inexperienced, do not hesitate to fly across all kinds of countries in our light aeroplanes. Voyages to South Africa and back in light aeroplanes, and even all the way to Australia, have now become so common that they have almost ceased to attract attention.

These light aeroplanes and their engines have been so successful that licences for their manufacture have been taken in the United States, a country which in many ways has shown us how to do things which in the end we have done much better for ourselves,—after combining our material and workmanship and detail design with American ideas.

Looking forward to the future, prospects for British aero-engines are particularly bright. As the illustrations to these articles have shown, this week and last week, our aero-engine firms are doing very handsome trade abroad, and in that way they are bringing into this country either in purchase money or in royalties, handsome contributions to our National revenue. But over and above the actual money brought in, the fact that British aero-engines are so largely used abroad, or are built under licence to such an extent, is in itself a most valuable advertisement for the whole British Aircraft Industry.

Even if a British engine makes a foreign-built aeroplane perform better than it would with a native engine, the behaviour of that British engine proves to the foreign customer that as an engineering nation we still hold our place in front of others. And if that foreign-built aeroplane, in spite of its performance, does not turn out satisfactory, then that country is much more likely in future to buy British aeroplanes with British engines. And so in that way, as well as in actual performance, the British aero-engine trade has helped the progress of British Aviation.

In conclusion, there is one point which one would like to bring to the attention of readers in the British Dominions and particularly to British pilots who left England a year or more ago, and, having flown the latest aeroplanes built in other countries, think that these machines (and sometimes their engines) are better than British aeroplanes and engines. That is the fact that until they have flown the latest British aircraft they should not be in a hurry to make comparisons.

Admittedly other countries are making progress. But we seem to have progressed still more in the past year than our competitors. Readers over-seas must not compare the newest foreign aeroplanes with British machines which they flew two or three years ago. Let them wait till they have seen, or tried, the newer types which are the result of our progress in 1929.—C. G. G.

SCHNEIDER RULES FOR 1931.

During the week-end January 18—19 a meeting of the *Fédération Aéronautique Internationale* was held in Paris to consider the proposals of the Royal Aero Club of Great Britain for the revision of the rules for the Schneider Trophy Contest of 1931,—if any other country should callenge us.

According to the unalterable rules of the Contest each Contest must be held over the waters of the nation which wins the previous Contest, and so any next Contest must be flown over British waters.

The Royal Aero Club suggests that the navigability trials and the speed contest shall both be held on the same day, because, where so much organisation is involved, we cannot risk having everything upset by taking the chance of having two fine days in succession. Last year's weather was about one chance in ten thousand.

There may be some argument as to the way in which the navigability tests are to be done in relation to the actual speed contest, but there can be no argument as to the desirability of doing the whole thing in one day.

The second suggestion made by the Royal Aero Club is that in future each entrant must cover each machine entered with a guarantee of 200,000 francs (approximately £1,700 at the present rate of exchange). One gathers that this caused a certain amount of alarm among possible entrants. Incidentally on this point the reader should make a mental distinction between an entrant and a competitor.

Hitherto the entrance fee has been 5,000 francs per machine, which at the present rate of exchange is somewhere below £50. At that price any country wishing to appear in the international limelight might think worth while the entering of a team of three machines, or any country which thought rather highly of one of its designers or constructors might enter a team on the off chance of having a machine fit to compete.

That being so, the country on which the responsibility of organising the Contest rests would have to go to all the expense of preparing sheds and workshop accommodation for the machines and housing for the crews, long before the date of the Contest.

For instance, last year, preparations had to be made for the French team right up to a week or two before the date fixed,—when official cancellation of the entry was received. And accommodation was actually arranged for the single American entrant, because right up to a few days before the Contest we were continually being told by the American Press that Lieut. Williams' machine was coming on the next boat.

As a matter of fact the American entry was never cancelled. Not even when the last possible boat which could have brought the machine had left the States was a letter or a cable sent to us saying that the machine was not coming.

Obviously, the greater the number of entries the greater the preparation would have to be for their housing, and, what is even more important, the greater would be the public interest in the Contest and the greater would be the cost of preparing for a big crowd to see the Contest. Consequently there must naturally be some adequate guarantee by nations entering for the Contest that the nation which organises it shall not be let down financially by the non-appearance of their machines.

According to the British proposal the guarantee of 200,000 francs will be refunded for each machine which actually takes part in the Contest,—even if it should be eliminated as soon as launched in British waters. Therefore the proposal seems eminently fair and businesslike.

One has no official information on the subject, but one knows enough to be able to say that the Royal Aero Club spent something between £10,000 and £15,000 in organising the last Contest, apart from the fact that the Royal Air Force was put to considerable expense in vacating Calshot Air Station for the benefit of the competing teams. As the affair worked out, the Aero Club is slightly in pocket, but without Sir Charles Wakefield's munificent gift of £5,000 to the Racing Fund the Club would have been in debt somewhat heavily.

If the Italian team had failed to appear at the last moment, as did the American entry, all the preliminary expenses would have been a dead loss. Berths in the *Orford* would have been cancelled, and individual members would also collectively have been let in for some thousands of pounds. The various municipalities around the country, who had guaranteed sums towards the expense of the Contest, would not have handed over those sums, because they were contingent on there being a Contest.

Taking all these facts into consideration the Royal Aero Club is thoroughly justified in demanding the aforesaid guarantee of approximately £2,000 per machine entered. And no serious entrant will object to this guarantee, because such entrant will know that the sum will be returned if his machine takes any part in the Contest.

These points being granted, interest in the Contest now depends on whether private enterprise abroad challenges for the Trophy and whether private enterprise at home defends it.

Our Air Ministry has announced that it will not compete officially in future. But we know that the High Speed Flight still exists and will go on experimenting with last year's machines. In the interests of the R.A.F. new and improved machines and engines must be ordered for the High Speed Flight whether there is another Schneider Trophy Contest or not. And machines so produced may very well be lent to private entrants, among which the Royal Aero Club itself would be included, to defend our holding of the Trophy.—C. G. G.

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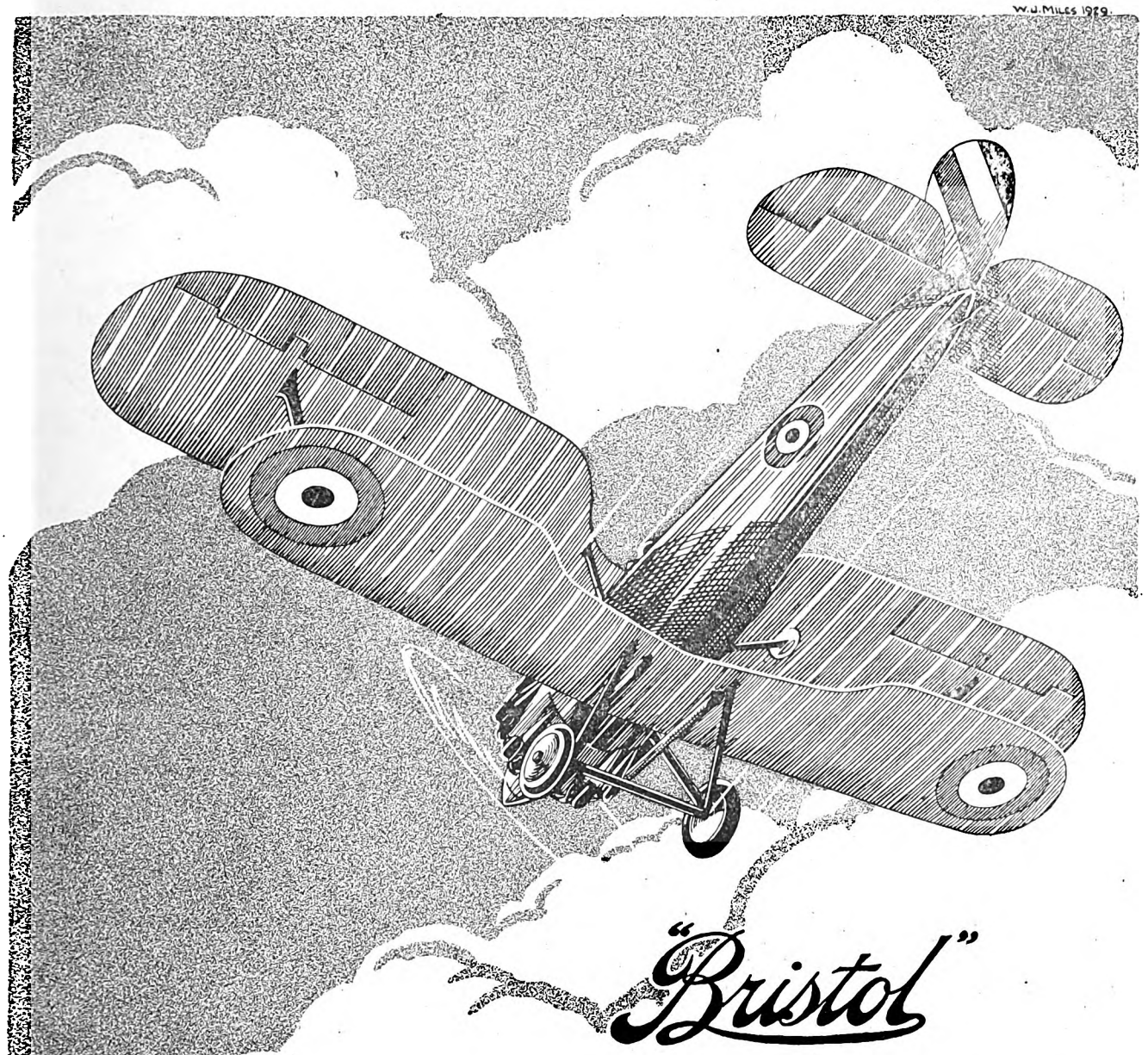

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A NAVAL DELEGATE.—Rear-Admiral W. A. Moffett, **U.S.N., who is the Air Adviser to the U.S. Naval Delegation at the Conference in London this week. Admiral Moffett is the chief of the Department of Aviation in the Navy Bureau at Washington. He is now serving his third term of four years in that post, which is itself a record, as no other Naval Officer has ever served more than two terms in one office.**

LORD WAKEFIELD OF HYTHE.

Sir Charles Cheers Wakefield, Bt., who was made a Peer in the New Year's Honours List, has taken the title of Lord Wakefield of Hythe.

THE ROYAL AERO CLUB BANQUET.

The Royal Aero Club Banquet will be held at the Savoy Hotel on Wednesday, Feb. 5.

H.R.H. The Duke of York has graciously consented to be present.

The Banquet is to be held in conjunction with the Royal Aeronautical Society, the Air League of the British Empire and the Society of British Aircraft Constructors. Members of these Societies wishing to attend should apply for tickets to the Royal Aero Club, 3, Clifford Street, W.1. The price of tickets (exclusive of Wines, etc.), is £1 1s.

LLOYD'S COMMITTEE.

The special Aviation Advisory Committee of Lloyd's Register of Shipping is now constituted as follows:—

Sir S. George HIGGINS (Chairman of Lloyd's Register).

Mr. Arthur L. STURGE (Deputy-Chairman of Lloyd's Register).

Mr. J. Howard GLOVER (Chairman of the Sub-Committees of Classification of Lloyd's Register).

Mr. Percy HARGREAVES (Chairman of Lloyd's, and member of the Committee of Lloyd's Register).

Mr. I. C. GEDDES (Director of the Managers of the Orient Steam Navigation Company, and member of the Committee of Lloyd's Register).

Captain A. G. LAMPLUGH (Underwriter, British Aviation Insurance Group).

Lieutenant-Colonel C. E. C. RABAGLIATI (underwriting member of Lloyd's, and of Messrs. Willis, Faber and Dumas).

From the Society of British Aircraft Constructors:—Mr. F. HANDLEY PAGE (chairman); Mr. R. A. BRUCE, Westland Aircraft Works (deputy-chairman for aircraft); Mr. A. F. SIDGREAVES, managing director of Rolls-Royce Limited (deputy-chairman for engines); Mr. C. C. WALKER, De Havilland Aircraft Company.

From the Royal Aeronautical Society:—Lieutenant-Colonel J. T. C. MOORE-BRABAZON (vice-president).

From the Royal Aero Club:—Sir Philip SASSOON, M.P. (chairman).

From Imperial Airways Limited:—Air Vice-Marshal Sir Vyell VYVYAN (director).

From National Flying Services Limited:—A representative still to be elected.

The announcement of the names by the Secretary of Lloyd's is accompanied by the following notes:—

It will be seen that this Committee, comprising as it does representatives of all concerned, will be well qualified to render valuable service in promoting the development on sound lines of civil aviation. Considerable progress has already been made in the matter, and with the formation of this new Committee it may be anticipated that the activities of the society in this branch of work will be gradually extended, and will in time embrace many of the services which Lloyd's Register has so long and so successfully rendered in the sphere of shipping.

The society's surveyor for aircraft is Mr. L. J. Hill, who was previously stationed at Croydon Aerodrome in charge of the inspection of civil aircraft on behalf of the Air Ministry, and his services are at the disposal of owners of aircraft and others who may desire to avail themselves of his expert knowledge and experience. Several inspections for the renewal of certificates of airworthiness under Air Ministry Regulations have already been held, and a large number of surveys on behalf of underwriters and others have been undertaken.

THE FASTEST AIRSHIP IN THE WORLD?

On Jan. 16 the R.100, which is the capitalist ship built by the Airship Guarantee Company for the Government, left Cardington for her high speed trials. When the ship returned to her base at 20.30 hours and had been moored the announcement was made that the airship had reached a speed of over 81 m.p.h. This is claimed to make the R.100 the fastest ship in the World.

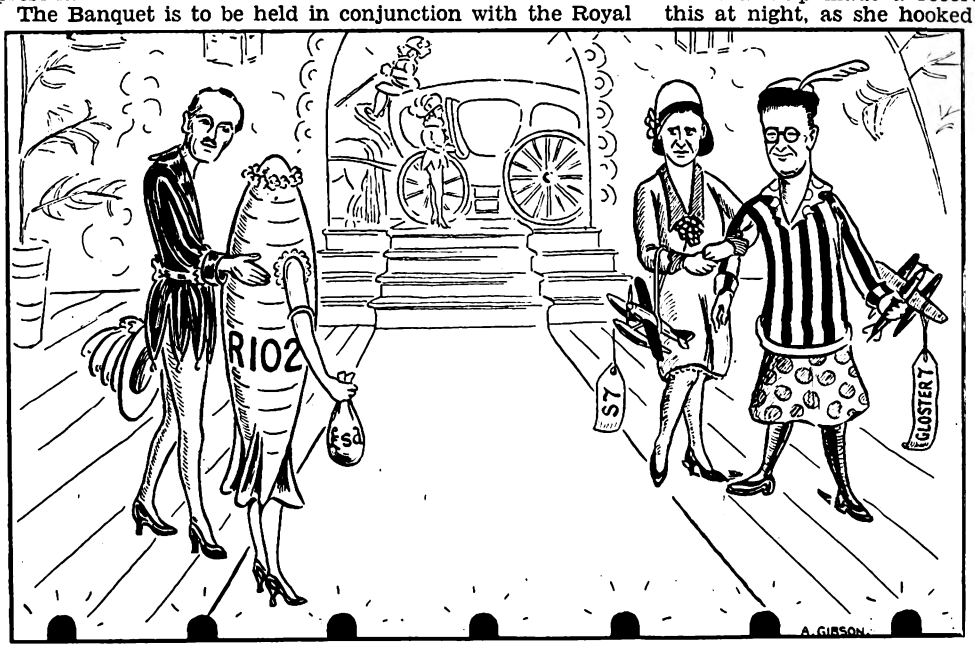
The R.100 was put in her shed after her second flight to have certain modifications made to the outer covering which was found to undulate, pulsate, pant, or throb, in the air. One of the objects of this third flight was to test a new method of securing the outer cover.

The airship made a record mooring of 33 minutes, and this at night, as she hooked onto the tower at 22.2 hours.

On Jan. 20 R.100 left Cardington at 09.00 hrs. and reached London about an hour later. The more athletic members of the staff of THE AEROPLANE rushed to the roof and had a good inverted plan impression of the ship.

After sweeping in a curve eastwards the R.100 turned south and later reached Aldershot where it circled the barracks at 2,000 ft

While the airship was over Aldershot a film was taken from an observation machine to record the behaviour of the outer cover at full speed.



CINDERELLA OF 1930.—Shall we have another try for the Schneider Trophy, or will our Air Minister's affection for airships spend the money on lighter-than-air craft?

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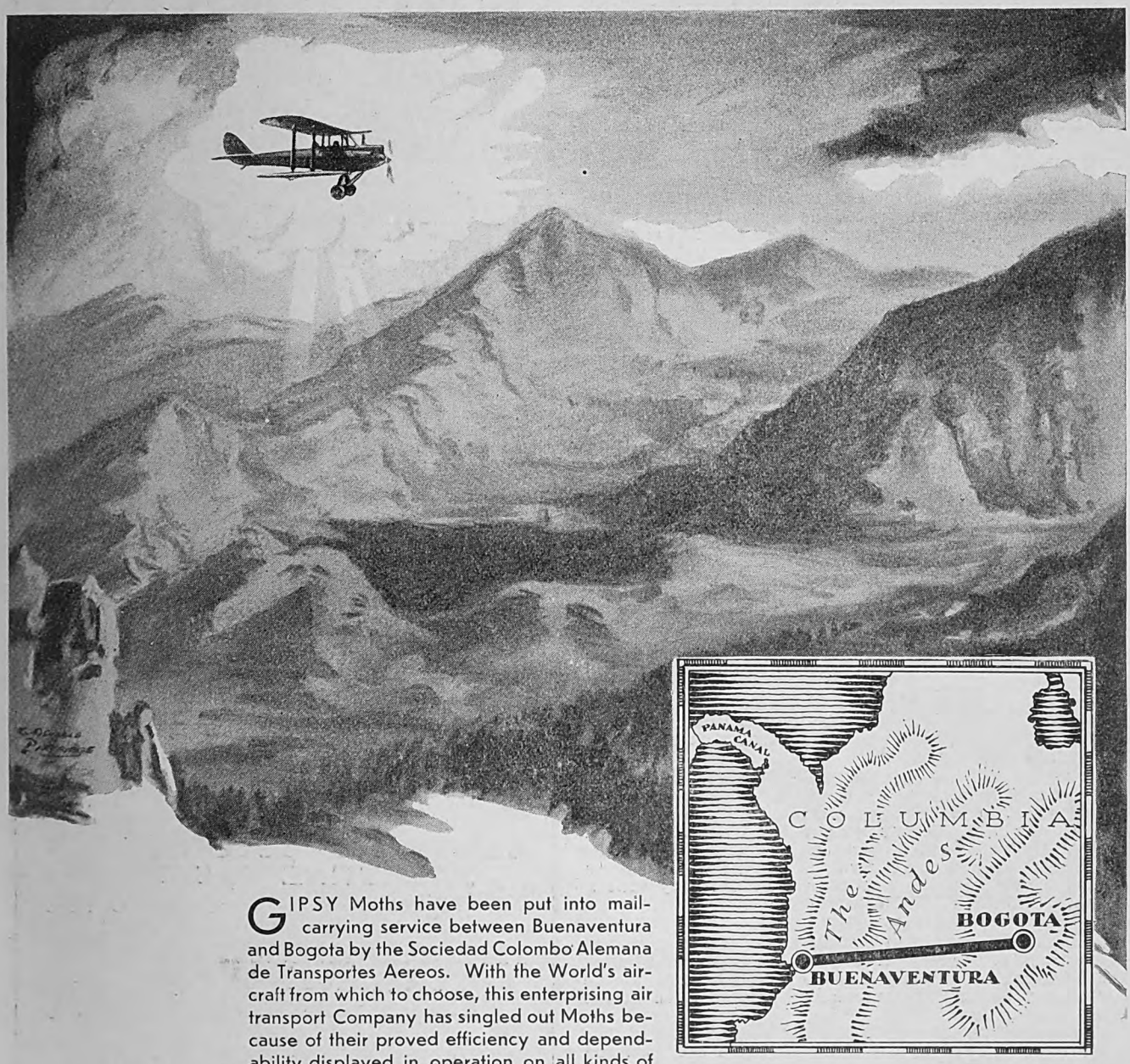
MOTHS FOR THE MAIL SERVICE ACROSS THE ANDES



GIPSY Moths have been put into mail-carrying service between Buenaventura and Bogota by the Sociedad Colombo Alemana de Transportes Aereos. With the World's aircraft from which to choose, this enterprising air transport Company has singled out Moths because of their proved efficiency and dependability displayed in operation on all kinds of service, and in every description of climatic and geographic condition. Moths are in use in almost every civilised land either for governmental, commercial or private purposes, and they are backed by a sales-service organisation second to none.

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THE FRENCH AIR ESTIMATES.

According to the Paris correspondent of *The Times* the French Air Estimates for 1930 show an increase of nearly 200,000,000 francs [£1,600,000] over the transitional estimates of 1929, which were drawn up soon after the formation of the Air Ministry. There is again a very large preponderance of military and naval expenditure over that allotted to commercial aviation. The total expenditure on the civil, military and naval air services for 1930 is estimated at 2,083,611,720 francs [£16,668,893].

Of this total, 459,440,060 francs [£3,675,520] are for civil aviation, while 1,624,171,660 francs [£12,993,373]—nearly four times as much—are to be spent on the fighting services.

The disproportion between civil and military expenditure is explained to a great extent by the fact that a large proportion of the aircraft in use in the fighting services is obsolescent, and so the Air Ministry is obliged to re-equip the military squadrons on an extensive scale.

Subsidies to various air lines amount to 210,150,000 francs [£1,681,200]. Research and new types of aircraft account for 100,000,000 francs, ground organisation for 39,962,000 francs, and factory equipment, 19,700,000 francs. There is an item of 3,587,000 francs [£28,696] for general propaganda and the encouragement of aviation. After the sum set aside for re-equipment (526,969,780 francs—£4,215,758), the largest item on the military side is pay and allowances, of which rather more than a quarter is for attached civilians. Frontier defence is to cost 1,500,000 francs, and there are "secret credits" of 2,000,000 francs. A supplementary credit of 6,000,000 francs will be required for the removal of air forces from the Rhineland and their establishment at home. [All of which is interesting, but the disproportion is nothing like that between Service and Civil Aviation in our own Air Estimates.—C. G. G.]

THE FRENCH HIGH SPEED FLIGHT.

M. Paillard is continuing his tests at Hourtin, near Bordeaux, with the Bernard high-speed training seaplane (600 h.p. Hispano-Suiza engine). This machine is actually a modification of the Bernard 20C-1 single-seat fighter monoplane fitted with floats, and a high-compression engine.

M. Sadi Lecointe has arrived at Hourtin and is awaiting the arrival of the Nieuport-Delage monoplane (1,000 h.p. Hispano-Suiza engine).

THE PRINCE OF WALES'S AFRICAN TRIP.

There seems to be some likelihood of H.R.H. the Prince of Wales extending his African tour so that he returns home by way of Egypt.

In 1928, while the Prince was on a hunting trip in British East Africa with Prince Henry, H.M. the King fell ill and the Prince had to hurry home. The journey took weeks, whereas with air transport he could have reached home in a few days.

For about six weeks from Feb. 15 His Royal Highness will be hunting round Dodoma. There is some likelihood of his flying from Broken Hill to Lake Tanganyika on his way to Dodoma, as the road is bad.

A NEW RECORD FOR ITALY.

On Jan. 20 Renato Donati completed a flight of 29 hrs. 3 min. 9 sec., in which time he covered a distance of 2,800 kms. (1,740 miles). He was flying a Fiat A.51 (85 h.p. Fiat).

This, if homologated, beats the existing record for distance in a closed circuit for light aeroplanes (two-seaters of less than 400 kgs.), which is held by Germany with a distance of 1,601 kms. (994 miles).

SAFE IN THE SUDD.

On Jan. 2, as reported in THE AEROPLANE of Jan. 8, Messrs. Haines and Thorne left Croydon for the Sudan in a Fairey III.F (Armstrong Siddeley Jaguar) which belongs to the Air Survey Co. Ltd. This machine reached Juba in the Sudd area on Jan. 21.

The controlling interest in the Air Survey Co. Ltd. has lately been acquired by the Fairey Aviation Co. Ltd., and with this backing the firm should have greatly increased scope.

KEENNESS.

Some idea of the keenness of the modern school-boy on aviation may be gathered from the fact that at the Harrow County School there exists an "Airway Club" composed of boys between the ages of 14 and 16 which has fifty members. All are keen air enthusiasts, and meet every Friday afternoon to discuss or debate aeronautical events of the previous week. Afternoon and evening lectures are also organised.

Recently one of the staff from Stag Lane has been giving a series of lectures on "Flying." During the Summer the members of the club paid visits to Croydon and to the Fairey Aviation Company's works at Hayes. Out of their own pocket-money the members have provided quite a good library of books and magazines. One suggests to aircraft firms that copies of their more popular booklets and brochures would be appreciated by these enthusiasts. The secretary is Mr. Kenneth Marshall, Belhaven, Love Lane, Pinner, Middlesex.

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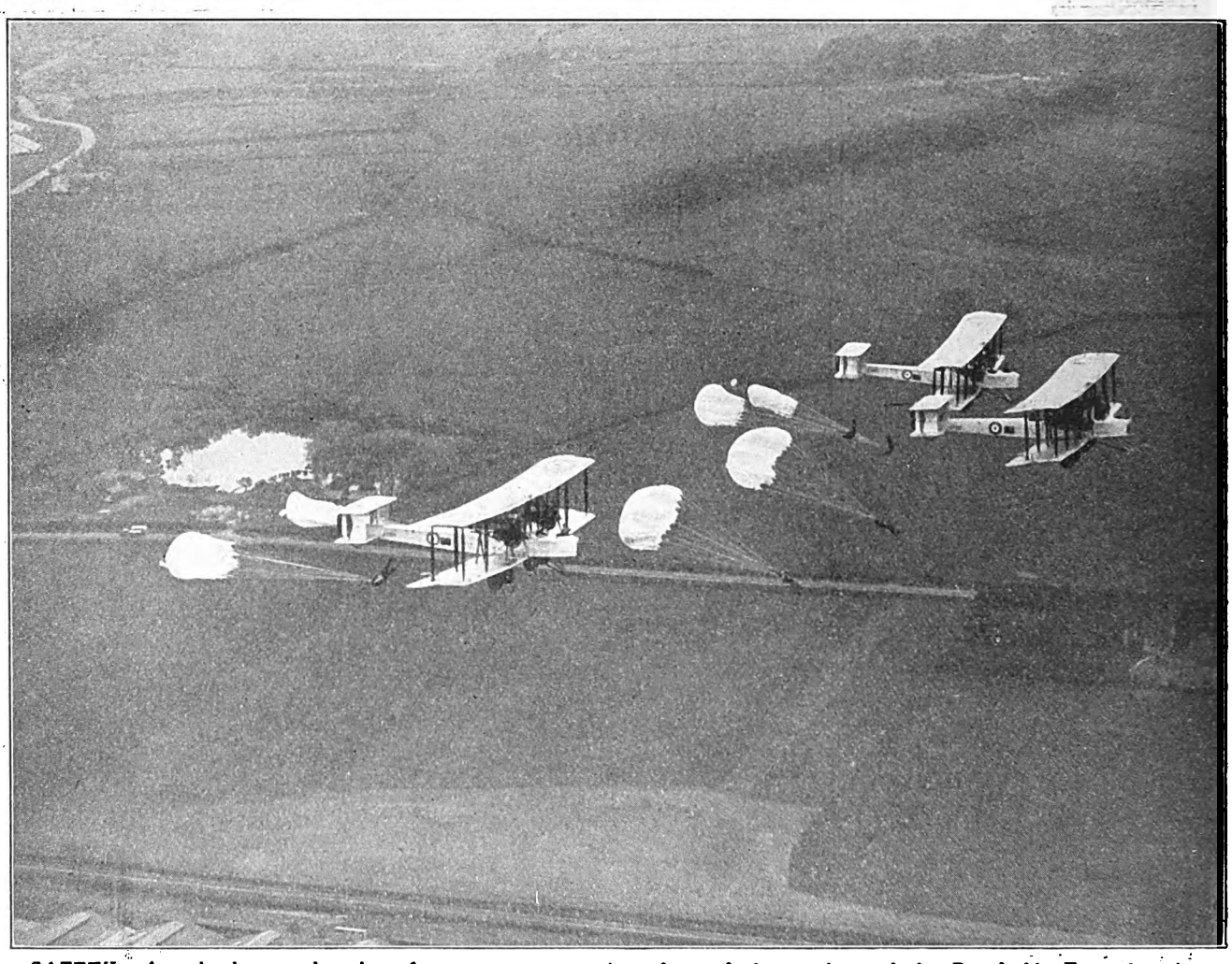

SAFETY.—Actual photograph taken from an accompanying plane of six members of the Royal Air Force jumping simultaneously with IRVIN Air Chutes from Vickers Vimy bombers.

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Calshot, 5/12. A. J. Rankin, A.F.C., to No. 70 Sqdn., 'Iraq, 3/1. D. L. Evans, M.C., D.F.C., to H.Q., R.A.F., Middle East, 3/1. R. A. A. Cole, to No. 502 Sqdn., Aldergrove, 5/12. R. W. E. Bryant, to No. 14 Sqdn., Palestine, 3/1.

Flying Officers H. J. Brown, to Night Flying Flight, Biggin Hill, 14/1. K. E. Parker, to R.A.F. Depot, Uxbridge, 10/12. H. J. Maugham, to No. 24 Sqdn., Northolt, 19/12. G. P. Macdonald, to No. 8 Sqdn., Aden, 30/12. G. E. E. Singleton, to R.A.F. Depot, Uxbridge, 5/12. C. H. R. Little, to R.A.F. Depot, Uxbridge, 3/12. R. R. Bennett, to No. 2 Sqdn., Manston, 1/1. P. V. Williams, to No. 5 F.T.S., Sealand, 30/12. A. D. Gillmore, to No. 3 Sqdn., Upavon, 1/1. J. C. K. Rogers, to No. 202 Sqdn., Malta, 3/1. R. C. Field, to No. 208 Sqdn., Middle East, 3/1. W. H. Merton, to School of Photography, S. Farnborough, 6/1.

Pilot Officers F. Read, to No. 17 Sqdn., Upavon, 21/12. D. F. Satchwell, to No. 16 Sqdn., Old Sarum, 21/12. G. D. W. Frayling, to R.A.F. Depot, Uxbridge, 5/12. The undermentioned Pilot Officers are all posted to the R.A.F. Depot, Uxbridge, on appointment to S.S. Comns., on probation, with effect from 27/12:—C. E. Alven, D. J. Alvey, W. B. Bailey, J. Bamber, E. V. N. Bramley, R. A. Byrne, M. G. C. Ghadwick, R. F. Chester, H. MacK. Chubb, A. R. T. Coke, C. W. W. S. Conway, L. E. Dalrymple, E. Elgey, C. J. Farrell, E. MacK. Gurney, G. J. Holland, D. Holt, L. W. V. Jennens, A. W. R. Lawson, R. P. J. Legborne, N. S. Lesmere, D. W. Lucke, R. A. McMurtrie, R. J. R. H. Makgill, W. R. Ottewill, W. C. Pitts, W. T. Ratcliffe, B. P. Reynolds, H. W. Riley, A. C. Sant, L. E. B. Stonhill, M. F. Summers, W. B. Thompson, G. R. White, R. B. Whittingham, A. R. Wilson, F. Woodward.

STORES BRANCH.—Wing Commander E. W. Havers, to H.Q., A.D.G.B., Uxbridge, for Stores Staff duties, 14/12.

Squadron Leaders F. R. Wilkins, to A.A.E.E., Martlesham Heath, 12/12. W. C. Clark, to Air Ministry (D. of E.), 6/1.

Flight Lieutenants C. E. Tidy, to A. and G. School, Eastchurch, 21/12. C. H. Masters, to Aircraft Depot, 'Iraq, 3/1. G. Baker, to No. 1 School of T.T. (Apprentices), Halton, 8/1.

Flying Officers J. W. Hustwaite, to R.A.F. Depot, Middle East, 3/1. D. G. McDiarmid, to R.A.F. Depot, Middle East, 3/1. E. N. A. Crowe-Browne, to Aircraft Depot, 'Iraq, 3/1.

ACCOUNTANT BRANCH.—Flight Lieutenant J. H. S. Richards, to H.Q., 'Iraq Command, 24/11.

Flying Officer K. A. Jackman, to H.Q., 'Iraq Command, 7/12.

CHAPLAINS BRANCH.—The Rev. D. F. Blackburn, to H.Q., R.A.F., Cranwell, 7/1.

The Air Officer Commanding Cranwell.

Air Commodore A. M. Longmore, C.B., D.S.O., *q.s.*, whose appointment as Air Officer commanding, R.A.F., Cranwell, and Commandant of the Royal Air Force College, Cranwell, is dated Dec. 16, 1929, was born at St. Leonards, New South Wales, Australia, in 1885. He was educated at Bengeo School, Hertford, at Stublington and in H.M.S. *Britannia*. He entered the Royal Navy as a Midshipman in 1901 and was appointed Sub-Lieutenant in 1904, and promoted to Lieutenant in 1906.

Early in 1911 Lieutenant Longmore, who was at that time serving in H.M.T.B.24, was one of the four officers selected by the Admiralty, out of the 200 who came forward, to learn to fly. They were taught by Mr. G. B. Cockburn on Short biplanes lent by Mr. Frank McClean on an aerodrome belonging to the Aero Club, so the Admiralty incurred no expense other than their pay.

War in the Air, Volume I, states:—

They were keen and apt pupils, as they needs must have been, to qualify for their certificates in six weeks of bad weather, which included one considerable snowstorm.

Lieutenant Longmore qualified for his Royal Aero Club certificate, No. 72, on April 25, 1911. In October of that year the Admiralty sent two aeroplanes and twelve naval ratings to Eastchurch to join the four officers there as a basis of a naval flying school. This small unit directed its activities to adapting the aeroplane to naval work.

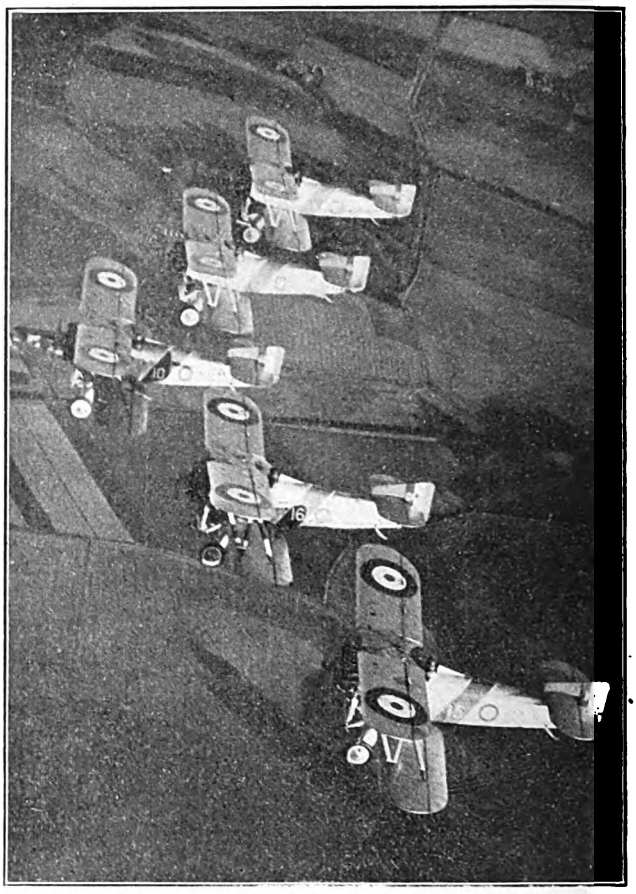
Lieut. Longmore and Mr. Horace Short concentrated on designing and testing various types of floats and flotation bags with results which proved of considerable value. And in November, 1911, Lieut. Longmore, on a Short biplane with flotation bags attached to the skids flew from Eastchurch and alighted in Sheerness Harbour. This was the first flight from land to water in English History. The machine was towed ashore and was then flown back to Eastchurch.

In May, 1912, when the Royal Flying Corps was formed, Lieut. Longmore was one of the eight officers to hold an aviator's certificate among the total of twenty-two officers in the Naval Wing. He held the appointment of Squadron Commander, which he retained when the Royal Naval Air Service was formed.

During the Naval Manœuvres of July, 1913, the Air Station at Cromarty, part of the strength of the Blue Fleet, was commanded by Lieut. Longmore. In July, 1914, he was promoted to the acting rank of Lieut.-Commander, R.N., and his Flight of Sopwith aeroplanes, and one Short seaplane from Calshot took part in the Naval Review at Spithead during that month.

He was promoted Lieut.-Commander, R.N., and Wing Commander, R.N.A.S., in December, 1914.

In October, 1914, No. 1 (Naval) Squadron was formed under Squadron Commander Longmore and when Commander Samson's unit was withdrawn from Dunkirk in February, 1915, its place was taken by No. 1 (Naval) Squadron. The equipment of this Squadron was five 80 h.p. Avros, one 80 h.p. Bristol and one 100 h.p. Vickers.



FLEET AIR ARM GREETINGS.—The Christmas card of No. 405 (Fleet Fighter) Flight, R.A.F., in H.M.S. "Furious."

War in the Air, Volume II, says:—

It was not long before the fact that the enemy was assembling submarines at Antwerp became known to the Admiralty and Sq. Cdr. Longmore was ordered to bomb the dockyards. Bombing attacks were made on Mar. 24 and April 1.

Shortly after this a Naval Squadron of 8 Avros and 4 Sopwith Scouts under Wing Cdr. Longmore was lent by the Admiralty to work under the orders of the O.C., Royal Flying Corps. He was specially mentioned in Dispatches for the efficiency of this squadron in France. He was awarded the Belgian Order of the Crown in November, 1915.

In January, 1916, he relinquished his R.N.A.S. appointment and reverted to sea service but was re-appointed Wing Commander, R.N.A.S., the following June. He was made a Chevalier of the Legion of Honour (France) in 1916 and awarded the French Croix de Guerre shortly after.

In December, 1917, he was promoted to Wing Captain, R.N.A.S., and appointed to the Malta and Adriatic Group. In a Despatch dated February, 1919, Admiral Thaon di Revel (Italy) expressed appreciation of his services in the Adriatic.

On the formation of the Royal Air Force in April, 1918, he was given the rank of Lieut.-Colonel. He was at that time senior R.A.F. officer on the Staff of the Commander-in-Chief, Mediterranean, and held the temporary rank of Colonel.

In the New Year Honours of 1919 he was made a Companion of the Distinguished Service Order in recognition of distinguished services during the War. And in February, 1919, he was made an Officer of the Italian Order of St. Maurice and St. Lazarus, and in April, 1919, he was awarded the Italian *Croce di Guerra*.

In August, 1919, his name was removed from the Navy List on appointment to a permanent commission in the R.A.F. with the rank of Group Captain.

From February to November, 1920, he was on the Aeronautical Commission of Control in Bulgaria, and on his return to England was appointed to command No. 3 Group at Grantham. In 1922 he passed a course at the Staff College, Camberley, and in February, 1923, he was appointed to Headquarters, 'Iraq, for Air Staff Duties.

In July, 1924, he was promoted to Air Commodore and in November of that year was appointed to command No. 7 Group at Andover.

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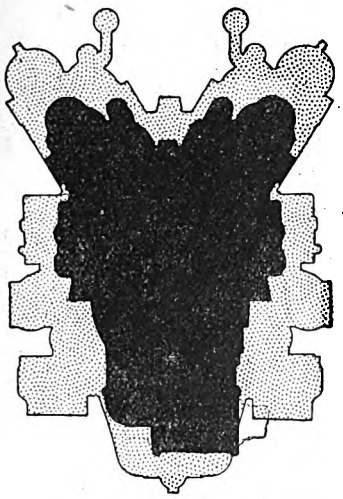

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In the New Year Honours of 1925 he was made a Companion of the Order of the Bath (Military Division) and in April, 1925, he was appointed to the Air Ministry, Directorate of Equipment. In November, 1926, he was appointed Chief Staff Officer, Inland Area.—C. M. MCA

Group-Captain M. G. Christie.

The retirement of Group-Captain M. G. Christie, C.M.G., D.S.O., M.C., deprives the Royal Air Force of an officer of unusual ability. Apart from that his departure will be deeply regretted by numbers of officers and men who were his friends or whom he befriended.

Malcolm Grahame Christie was born at Edgbaston, Warwickshire, and was educated at Leamington and Malvern. He afterwards took the degree of Doktor Ingenieur at the University of Aachen,—otherwise known as Aix-la-Chapelle.

Quite early in the day he became interested in flying from a scientific point of view. Being a young man of considerable means he bought one of the earliest Blackburn monoplanes and in it he did a large amount of flying round the North of England piloted by Mr. Harold Blackburn, who himself recently retired from the R.A.F. with the rank of Wing Commander after having commanded the Experimental Establishment at Martlesham. Malcolm Christie thereafter learned to fly at Hendon on a Caudron biplane, and though his Royal Aero Club Certificate number 954 is only dated October 27, 1914, he had in fact been a practical aviator for years before that.

On the outbreak of war in November 1914 he joined the Royal Flying Corps with the rank of Second Lieutenant and was promoted Captain in September 1915. In June 1916 he was awarded the Military Cross. In August 1916 he was given the temporary rank of Major and appointed to command a squadron.

In January 1917 he was made a Companion of the Distinguished Service Order.

In February 1917 Major Christie was appointed to form Number 100 Squadron, and took it to France in March 1917. This squadron was the first night-bombing squadron ever formed. It was equipped with F.E. 2bs. In 1918 it became a unit of the Independent Air Force in the East of France under General Trenchard.

In January 1918 he was appointed Wing Commander and temporary Lieutenant-Colonel and in April of the same year he was promoted Lieutenant-Colonel.

During the last year of the War he acquired a certain amount of highly desirable unpopularity by flying consistently in spite of his exalted rank. He had a habit of going up alone to see what the area was like over which his squadrons had to operate, and then collecting his squadrons together and leading them himself in a combined raid over enemy territory. Some officers of field rank who did not like flying, and some junior officers who disliked having a senior officer's eye on them when they were supposed to be in action, regarded this habit as most reprehensible. But it set an excellent example to others.

The opinion of the High Command may be judged by the fact that he was created a Companion of the Order of St. Michael and St. George in January 1919.

In December of that year he went on the half pay list as, in common with many others of our best officers, he was suffering severely from war-strain and overwork. In September 1920 he was one of the R.A.F. officers attached to the Department of the Controller of Civil Aviation.

From April 1922 to April 1926 he was Air Attaché to the British Embassy at Washington. And, while in this office, in June 1923, he was promoted Group Captain.

While in America he won the friendship and at the same time the respect of everybody with whom his duties put him in touch.

As an engineer of high ability the cleverest aeronautical engineers in the States regarded him as an equal. As a man and a pilot the keenest of the American aviators respected his judgment.

Where his duties involved the collection of technical information he displayed high ability. From friends in America one has heard that while Group-Captain Christie was always ready to exchange technical information with the Air Services of the United States, he always managed to get the information he wanted.

There is an old story of a colonel in the Southern States who was such a deadly shot with a rifle that when he went out shooting racoons, as soon as the coons saw him approaching they used to say, "Don't shoot, Colonel. We'll come down." And to a surprising extent that was the attitude of American technicians towards Group-Captain Christie. At any rate, that is what they used to say about him.

How much of the information which he acquired and sent to the Technical Departments of the Air Ministry of that period was ever transmitted to the British Aircraft Industry is another question, which might well have been investigated at the time.

For the last year or two of his service in the States he was a very sick man, undoubtedly because of the way in which, in spite of still suffering from war-strain, he overworked himself. He used to spend weeks at a time sleeping in trains and working all day at a rate which would have killed most men. After his return to England he went for a long rest-cure, which partly restored his health.

In July 1927 he was appointed Air Attaché to the British Embassy in Berlin. There his German engineering degree naturally put him in the closest touch with the German aeronautical scientists and technical people. And his distinguished service as a military aviator brought him that respect from German service people which is only given by one good soldier to another.

Unfortunately during these years since he went to Berlin his health has not improved as it should have done, and when one last saw him he was still far from being a well man. His many friends hope most sincerely that in retiring from the Service he will take such a rest and live such a healthy country life that he may soon return to help the progress of aviation with his experience and his brilliant intellect.—C. G. G.

New Equipment.

No. 33 (Bomber) Squadron, R.A.F., is being equipped with Hawker Harts (Rolls-Royce F.XIB supercharged engine) in place of the Hawker Horsleys (Rolls-Royce Condor III engine) with which the Squadron has been equipped since its formation in March, 1929.

The performance of the Hawker Hart is maximum speed 184 m.p.h., speed at 10,000, 172 m.p.h., climb to 10,000, 8 minutes.

No. 33 (B) Squadron is stationed at Eastchurch and is commanded by Sq. Ldr. J. J. Breen.

Six Hundred Apprentices Wanted.

The Air Ministry announces that six hundred Aircraft Apprentices, between the ages of 15 and 17, are required by the R.A.F. for entry into the Schools of Technical Training at Halton, and at Cranwell. They will be enlisted as the result of an Open Competition and of a Limited Competition which will be held in the near future by the Civil Service Commissioners and the Air Ministry respectively. Successful candidates will be required to complete a period of twelve years' regular Air Force service from the age of 18, in addition to the training period. At the age of 30 they may return to civil life or may be permitted to re-engage to complete time for pension.

Full information regarding the dates of the respective examinations, the methods of entry and the aircraft apprentice scheme generally can be obtained upon application to the R.A.F. (Aircraft Apprentices' Dept.), Gwydyr House, Whitehall, London, S.W.1. The sons of officers, warrant officers and senior n.c.o.s of the three Services will receive special consideration.

The principal trades open to boys are metal rigger, a new trade brought into existence by the introduction of the metal aeroplane, which involves training in both fitting and sheet metal work; fitter (aero-engine); fitter (driver, petrol); fitter (armourer); coppersmith and metal worker; wireless operator-mechanic and electrician. The apprentices are given a thorough training in their trade by highly qualified technical instructors and their general education is also carried on simultaneously by a staff of graduate teachers.

The New Director of Airship Development.

The Air Ministry announces that Wing Cdr. Reginald B. B. Colmore, O.B.E., has been appointed Director of Airship Development with effect from Jan. 1, 1930.

Wing Cdr. Colmore has been Deputy Director of Airship Development since the revival of the airship programme in 1924. He was originally in the Navy and had retired when War broke out in 1914. He rejoined the Navy and saw service with the Armoured Car Division at Antwerp and in Gallipoli.

In 1916 he transferred to the Royal Naval Air Service and was attached to several airship stations. He did valuable work in connection with non-rigid airships in anti-submarine patrols over the English Channel.

Between the Armistice and 1924 he was the R.A.F. officer attached to the Department of Civil Aviation for Airship Duties.

Flight Cadetships and Scholarships.

Aircraft Apprentices S. W. Needham and E. F. Porter from No. 1 School of Technical Training (Apprentices), Halton, and Aircraft Apprentices R. Monks and A. Pyke from the Electrical and Wireless School, Cranwell, have been selected for cadetships at the R.A.F. College, Cranwell, on the result of the examinations held on completion of their three years' training as aircraft apprentices.

Sir Charles Wakefield Scholarships valued at £75 each have been awarded to Flight Cadet D. V. Johnson on the result of the recent competitive examination for entry into the R.A.F. College and to Flight Cadet S. W. Needham. The Hyde-Thomson Memorial Prize valued at about £33 has been awarded to Flight Cadet R. Monks.

Prize Cadetships.

The Air Ministry announces that the Air Council have awarded Prize Cadetships each of the value of £105 per annum for two years to the following successful candidates

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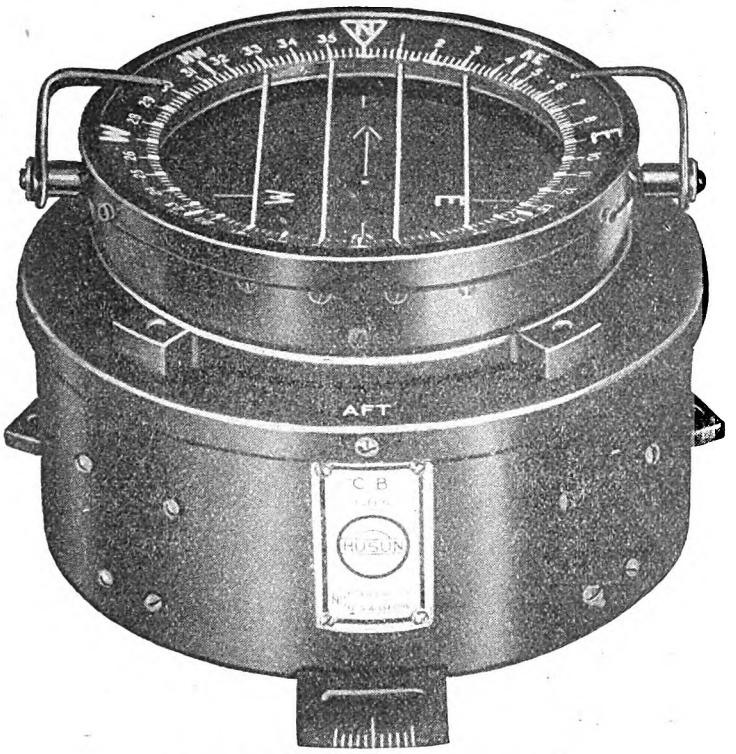
"Husun" Aperiodic Compass.



Type Av. 776 (Mark IIIA Luminous.)

This is the popular Type Av. 745 (Mark IIIA) "Husun" Aperiodic Compass radiumised for reading at night without the aid of artificial light. Radium is applied to the four cardinal filaments and lubber point, as well as to the grid wires and every 10° mark. All the letters on the "grid" are also treated with radium compound, and these are protected from dirt, weather, and damage by a cover glass.

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The course is set by rotating and fixing the "grid" to the desired direction by the lubber, and bringing the machine round until the N.S. pointer is parallel to the grid wires, with the arrow to "N" on "grid."

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at the examination held in November last for entry into the Royal Air Force College, Cranwell:—

G. H. O. Mills (Plymouth College), R. H. A. Leigh (Cheltenham College), N. G. Goodman (City of London School), R. H. E. Emson (Christ's Hospital), J. S. Chadd (Framlingham College), and H. P. Jenkins (King's College, Taunton, Somerset).

Central Flying School Categories.

The following officers have been recategorised as under from the dates stated against their names:—

A.2 to A.1: Sq. Ldr. W. R. Cox, M.C., A.F.C., 6.12.29; Flt. Lt. G. E. Gibbs, M.C., *p.s.a.*, 12.12.29; Flt. Lt. R. P. P. Pope, D.F.C., 14.12.29; Flt. Lt. H. M. Massey, M.C., 12.12.29; Flg. Off. J. G. D. Armour, 12.12.29.

B to A.2: Flt. Lt. J. Bradbury, 12.12.29; Flg. Off. P. R. Barwell, 12.12.29; Flg. Off. S. H. Y. Harris, 12.12.29; Flg. Off J. H. McN. Campbell, 16.12.29; Flg. Off. G. J. Powell, 16.12.29.

B: Flt. Lt. L. G. Harvey, 6.12.29.

B to D: Flt. Lt. V. Harris, 12.12.29.

The following officer has been categorised an A.2 Instructor as from Nov. 28, 1929: Sq. Ldr. H. P. L. Lloyd, M.C., D.F.C.

Category C: The name of Flg. Off. J. F. McKenna is to be transferred to the list shown under category *B*.

Service Casualties.

The following leading article appeared in *The Army, Navy and Air Force Gazette* of Jan. 16:—

The occurrence in Egypt of the first flying accident of the Royal Air Force this year has again started on certain newspapers with their pernicious habit of totting up the number of *personnel* killed, and comparing one year's crashes with another. As has previously been pointed out in these columns, there is really no useful purpose served by this. It affords no guide as to whether Service flying is becoming more hazardous, or less, as that could only be determined by anyone who had full particulars of the number of hours flying against which to measure the incidence of casualties. Nor is it good to keep on reminding the public by a series of pin-pricks, as it were, that flying for military purposes still has an element of risk. The man in the street, asked whether more lives were lost in the R.A.F. or the R.N. last year, would probably say the former, remembering the many occasions upon which he had read of crashes and the frequency with which the newspapers had added up their totals. He would be wrong, for about as many lives were lost in two accidents in the Navy, the sinking of "H" 47 in collision and the gunnery explosion in the *Devonshire*, as in all the aircraft accidents.

The Great Stolen Mail Mystery.

Two mail bags were stolen from a hand trolley outside the Air Ministry in Kingsway on Jan. 17. They have not yet been recovered. An Air Ministry official has stated that they contain little of monetary value.

THE AEROPLANE believes that there is no foundation for the rumour that the bags contained portraits and detail-drawings (wirelessly transmitted) of Alfonso, the Air Ministry's Man-of-Mystery, and that they have been stolen by Dangerous Spies.

At any rate here is a wonderful basis for yet another brain-wracker by Mr. Edgar Wallace. Can it be that he—but no! That is impossible.

The Halton Aero Club.

The new Club House of the Halton Aero Club was opened on Jan. 20. The building is at the top of Addington Road and contains 12 rooms. At present only six of them have been finished but the others will be brought into use as required.

Two airscrews specially designed and made for the Club's machine, the H.A.C.3, have been presented to the Club by the Fairey Aviation Co. Ltd. and have arrived at Halton.

The membership of the Club on Dec. 31, 1929, was 1,600. Applications for 1930 membership should be made now.

Eight Aircraft Apprentices were elected students of the Royal Aeronautical Society at a Council Meeting of the R.Ae.S., held on Dec. 10, 1929.

Lectures are to be given during February and March on Irving Parachutes by Mr. Irvin; on the Airship R.101 by Wing Cdr. Cave-Browne-Cave; and on Wind Tunnels and Slotted Wings by Mr. Russell.

Inter-Service Rugby Football.

The Rugby Football match between the Royal Navy and the Royal Air Force will be played at Twickenham on Feb. 8 (kick-off at 15.00 hours).

Reserved stand tickets at 7s. 6d. and 5s. each (including admission to the ground) may be had from Mr. H. E. Woolway, Room 649, Air Ministry. Applications should be accompanied by cheques made payable to the hon. Treasurer, R.A.F. Rugby Union.

Rugby Football.

R.A.F. versus Bristol.—The R.A.F. were beaten by Bristol at Bristol on Jan. 18 by two penalty goals and one try (9 points) to one goal (5 points).

An extract from *The Times* account of the game reads:—

The game was continually being interrupted by the whistle blowing for R.A.F. infringements, and although they made one last breakaway, and were pressing when "No side" sounded, their movements were purely opportunist, unconvincing, and doomed to failure. In a word, they spoiled what must otherwise have been a memorable match by stupid tactics and Bristol won on their merits.

The R.A.F. team were:—

Plt. Off. Nicholson; Flg. Off. Hodder, Flg. Off. Pott, Plt. Off. Llewellyn and Flt. Off. Cotton; Flt. Lt. Odbert and Flg. Off. Maclean; Plt. Off. Williams, Flt. Lt. Beamish, Sjt. Kirby, Plt. Off. Constantine, Flt. Lt. Franks, Sjt. Hall, L-AC. Maxwell and Plt. Off. Letchworth.

The Bristol team were without J. S. Tucker who in answer to a last-minute wire from the English Selection Committee had flown from Bristol to Cardiff to play in the International match.

The following fixture has been added to those published in the R.A.F. Rugby Union Handbook, and in THE AEROPLANE of Oct. 2:—

Feb. 19, R.A.F. v. United Banks, at the Chartered Bank of India Ground, Northfields, Ealing.

Association Football.

The annual match between the Royal Air Force and the Corinthian F.C. was played at the Crystal Palace on Saturday, Jan. 18, and resulted in a win for the latter by five goals to one.

Although the Corinthians usually put their best team out against the R.A.F. it was impossible to do so this time, but a strong side was found, though they were not as superior as the score suggests. The goals scored by the home side were all magnificent efforts but similar shots from the R.A.F. forwards, Parrish and Kelly, seemed just to lack the little good fortune that would have got the ball into the net.

In the opening stages the R.A.F. forwards looked like making an early score but the Corinthian half-backs gradually asserted themselves and set their own attack in operation. After Parker had got the first goal for Corinth, the R.A.F. game became mainly defensive and remained so most of the time except for breakaways which originated mostly on the right wing. Sleightholme, the R.A.F. right winger, was the best of the forwards and later in the game when Parish was injured took the centre-forward berth and made the R.A.F. attack much more lively.

The Royal Air Force team in spite of their defeat gave the impression of being a very well balanced side and would probably prove more effective if the forwards adopted the five-in-line method so successfully demonstrated by their opponents on Saturday. The defence appears to be quite sound and Cpl. Robinson at centre half, who was a little below form, did some good constructional work in accurate passes to the wings, though he rather neglected the inside trio in this respect.—C. A. S.

R.A.F. *versus* Football Association:—The R.A.F. were beaten by a team of amateurs representing the Football Association at St. Albans on Jan. 9 by six goals to one. The R.A.F., who had played four games in a week, were represented by:—

AC. Chaston (Uxbridge); Cpl. Pond (Henlow), AC. James (Netheravon); Cpl. Kenny (Cranwell), Cpl. Robinson (Henlow), AC. Armstrong (Eastchurch); Sjt. Turner (Uxbridge), AC. Kelly (Henlow), Education Officer C. H. Sleightholme (Mountbatten), AC. Oates (Gosport), AC. Cooper (North Weald).

To-Day's Great Thought.

If all the hundreds of readers of THE AEROPLANE who write to the Editor asking how to get into the Royal Air Force had enough intelligence to qualify as members of that Force they would write direct to the Secretary of the Air Ministry, Kingsway, W.C.2, asking for conditions of entry.

This does not refer to the Regular Readers of THE AEROPLANE, whose intelligence is naturally of a very high order, but to Casual, Haphazard, and Unthinking Readers.

At the same time the Editor is very willing to help those readers who, having got their information from the Air Ministry, are still in doubt on certain points of strategy or tactics or procedure.

THE DEATH OF SIGNOR DAL MOLIN.

On Jan. 18, a seaplane flown by Warrant Officer Dal Molin dived into Lake Garda close to Desenzano, and the pilot was killed. The machine is reported by the Milan correspondent of *The Times* to have been the Savoia-Marchetti tandem-engined seaplane. In this craft the pilot sat in a nacelle above the wings, between the two engines, which drove a tractor and a pusher airscrew. The tail unit was carried by outriggers.

Signor Dal Molin will be much regretted by all those who came in contact with the Italian team at Calshot. He became a pilot in 1922 and specialised in flying single-seat fighters and in aerobatic flying.

He was the only member of the Italian team to complete the course in the Schneider Trophy, and as Flg. Off. Atcherley was disqualified he was placed second.

He flew the record-breaking Macchi 52 bis in which Major de Bernardi had put up a World's Record.

Everybody connected with Aviation in this country and especially high-speed flying, will sympathise with Italy in the loss of one of her most able pilots,—a man who impressed all with his keenness.

Lord Thomson, Secretary of State for Air, has sent the following message to General Balbo, the Italian Air Minister:—

"On behalf of Air Council and Royal Air Force tender deepest sympathy in death of the gallant airman, Warrant Officer Dal Molin, whose performance in the Schneider Trophy contest aroused the greatest admiration."

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THE PASSPORT TO THE AIR

LIKE a British passport, the N.F.S. Membership card carries privileges to its bearer in other places than "home." The N.F.S. air parks and stations in different parts of the country exist to give service to the private flyer and a member of any one of the N.F.S. clubs is entitled to service at each and every N.F.S. centre.

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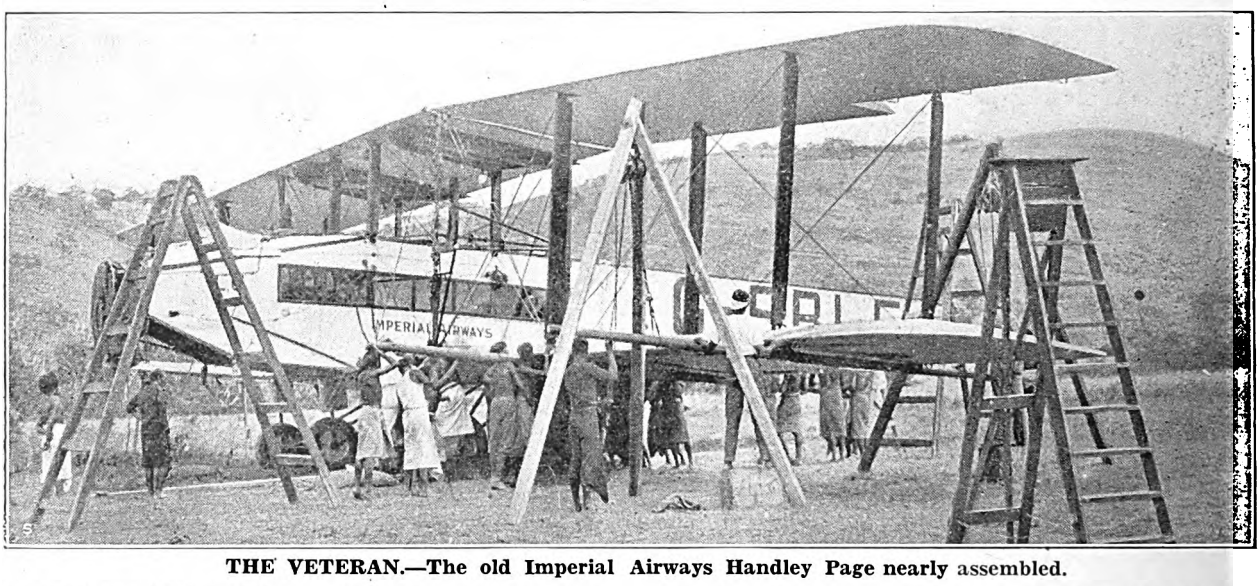
AIR TRANSPORT IN NEW GUINEA.



THE VETERAN.—The old Imperial Airways Handley Page nearly assembled.

By courtesy of Colonel the Master of Sempill THE AEROPLANE is able to publish some interesting pictures of British enterprise overseas. Mr. W. R. E. Satchell, who sent the photographs and the description of the doings in New Guinea, served in Japan as senior warrant officer (rigger) under Colonel Sempill with the mission which he took to Japan shortly after the War to teach the Japanese Navy to fly. Later Mr. Satchell was with Imperial Airways.

G-EBLE was a three-engined Handley Page which was used on the cross-Channel service for some time and was bought last year by the New Guinea Goldfields Co. to carry supplies from the coast up to the mines at Wau.

The mines are at 3,500 ft. above sea-level and between there and the coast a mountain at 6,000 ft. has to be crossed. As Mr. Satchell's letter shows, the flying time from Wau to the coast is 25 minutes. Transport by land takes several weeks, and everything has to be carried on man-back.

The transport of anything in the way of heavy machinery takes months, consequently even heavy things like crankshafts and cylinders of mining engines and parts of hydraulic and stamping machinery can be transported by air as a paying proposition. Here is Mr. Satchell's description of the conditions under which aviators and miners work:—

We have our hangar up at the Wau, which is the centre of the mining operations, and the climate is simply perfect. We are 3,500 feet above sea-level.

Coming out we stayed at Singapore for 14 days so it gave us plenty of time to look round. We assembled the machine at Fort Moresby, at least, the fuselage, centre section, and undercarriage, and then had to tow it three miles to the ground which was cut down for us, encountering a number of difficulties on the way. In one place our starboard outer wheel was hanging out over the sea.

Imperials wired asking how long it would take to build, so we said six weeks, and on the last day at 4 o'clock we were in the air on test. Everything O.K.,—flew hands off.

We then had to fly to Lae, which is the other side of the island, about 240 miles,—one of the worst runs I know of, nothing but mountains and forest and not the least possible chance of landing anywhere.

When we arrived at Lae everyone said we could not land at Salamoa—this by the way is an aerodrome built by the Company—so Captain Thomson our pilot said we would go over by pinnace and look at it ourselves. Arriving there we found a most perfect landing ground, so we went back and flew up to the mines at Wau and the next day went down to Salamoa, making a perfect landing, and since then we have been operating daily.

It takes 25 minutes from Wau to Salamoa climbing over the top at 6,000 feet. Captain Thomson is a splendid pilot and a real good man to be with.

The natives of this country are a poor crowd, absolutely brainless; you cannot trust them with anything no matter how many times they have done it before. I put one coon on polishing the leather in the saloon the other day; he had used the polish on the same thing about a dozen times before, and, when I went to see how he was getting on, it looked as though someone had been in with a whitewash brush, all smears. I found he had been using the metal polish; I ask you. It took me about 1½ hours trying to get it out with a scrubbing brush and floor polish.

Then there is their nasty habit of eating each other. We are in the heart of it here and all our "boys" are pure-bred cannibals. I expect my four have had a leg or arm of an aunt or uncle of theirs. The pack "boys" on a fairly long journey very often come in one or two short,—they have been "kiki'd," as they call it

One coon was had up for the murder of his aunt, and when he was asked why he did it he said: "She talk, talk, talk, too much, so I think much better she die."

Another missionary "boy" referring to the aeroplane called it "motor-car along Jesus."

AIR TRANSPORT IN NEW GUINEA.—Getting together the Handley Page at Port Moresby.

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THE LIGHT AEROPLANE
AND THE FLYING CLUBS.

THE INTERNATIONAL LIGHT AEROPLANE TOUR.

A Conference was held in Paris on Jan. 17, to draw up the regulations for this year's contest. The Royal Aero Club was represented by Lieut.-Col. M. O'Gorman, C.B., Major C. J. W. Darwin and Mr. Harold Perrin.

The contest will be organised by the Aero Club of Germany (last year's winner) and the course will be approximately 7,000 kilometres, with landing places in most of the European countries. There will be two controls in England, namely, Bristol and London.

The contest will be held during the latter part of July.

NAVAL DELEGATES AT HANWORTH.

The Japanese delegates to the Naval Disarmament Conference paid a visit to the Hanworth Air Park on Sunday, Jan. 19, as the guests of Col. the Master of Sempill. Lord Thomson, the Secretary of State for Air, and Sir Sefton Brancker, the Director of Civil Aviation, were present and lunched with the delegates in the club house.

After lunch the visitors inspected some of the National Flying Services' aircraft which were lined up on the aerodrome, after which Flt. Lt. Schofield took the air and performed on one of the N.F.S. Cirrus-Moths. His aerobatics were very polished and his slow-rolling was quite amazing. The Autogiro, piloted by Mr. Rawson, flew over from Heston, did several circuits and landed almost vertically.

Just before this Mr. Desoutter and son in the latest and smartest of the Desoutter Coupés arrived from Croydon piloted by Mr. Flynn and caused something of a flutter by standing still in the air against a very moderate breeze before coming in to land.

Mr. Broad who had arrived from Stag Lane in his new aerobatic Gipsy-Moth then took off and proceeded to evolute gracefully—one trick was doing the first half of an outside loop and then the second part of an inside loop. The resulting "S" is spectacular.

The visitors were afterwards taken for flights in a Desoutter Coupé belonging to N.F.S.

A MOTH FOR THE ANTARCTIC

On the last day of the old year the Moth seaplane which has accompanied Sir Douglas Mawson's expedition made its first flight in the Antarctic. Piloted by Mr. Campbell and carrying Serjeant Douglas the Moth ascended to 500 ft., from which height low, hilly, ice-covered land was sighted some 50 miles to the south, a 40-mile belt of unbroken ice and 10 miles of coastal water lying between.

The progress south of the *Discovery* has apparently now been blocked by ice, but this will not prevent the use of the Moth, which can be used on skis.

THE ASHWELL-COOKE CHALLENGE CUP.

One of the private-owner members of the Cinque Ports Club, Mr. J. R. Ashwell-Cooke, has evolved a beautiful scheme for keeping "A" pilots up to scratch *and* in the air. So he has presented a cup for monthly competition.

This cup will remain the property of the Cinque Ports Club, but it will be competed for on the first Sunday in each month. There is an entrance fee of 5s., and the total of such fees will be used for recording the winner's name on the cup and for buying a replica for him or her.

The competition is open to everyone provided each entrant is a genuine club-trained "A" licence pilot. No entrant can hold a "B" licence or be engaged in the Aircraft Industry. Nor can he be a serving pilot.

The competition is really a "dead-stick" landing from a height of 500 feet. That is one has to climb to 500 ft. above the aerodrome in five minutes, cut out the engine and land as close as possible to a mark placed on the aerodrome. A total of 100 marks is allowed each entrant and from this total marks are deducted as handicaps and for faults. The idea of the handicaps is to allow pilots with varying experience to compete on equal terms.

The first competition will be held on Feb. 2 at 11.45 hours. The Cinque Ports Club cordially invites visitors and looks forward to a number of entries. Forms can be got from the Hon. Secretary, 114, High Street, Hythe, Kent.

THE HALDON AIR RALLYE, 1930.

The next Air Rallye at Haldon, near Teignmouth, South Devon, will be held on June 21, 1930. The proprietors of the Haldon Aerodrome and School of Flying, the Agra Engineering Co., Ltd., hope by making this early announcement of the date to avoid clashing with other Clubs.

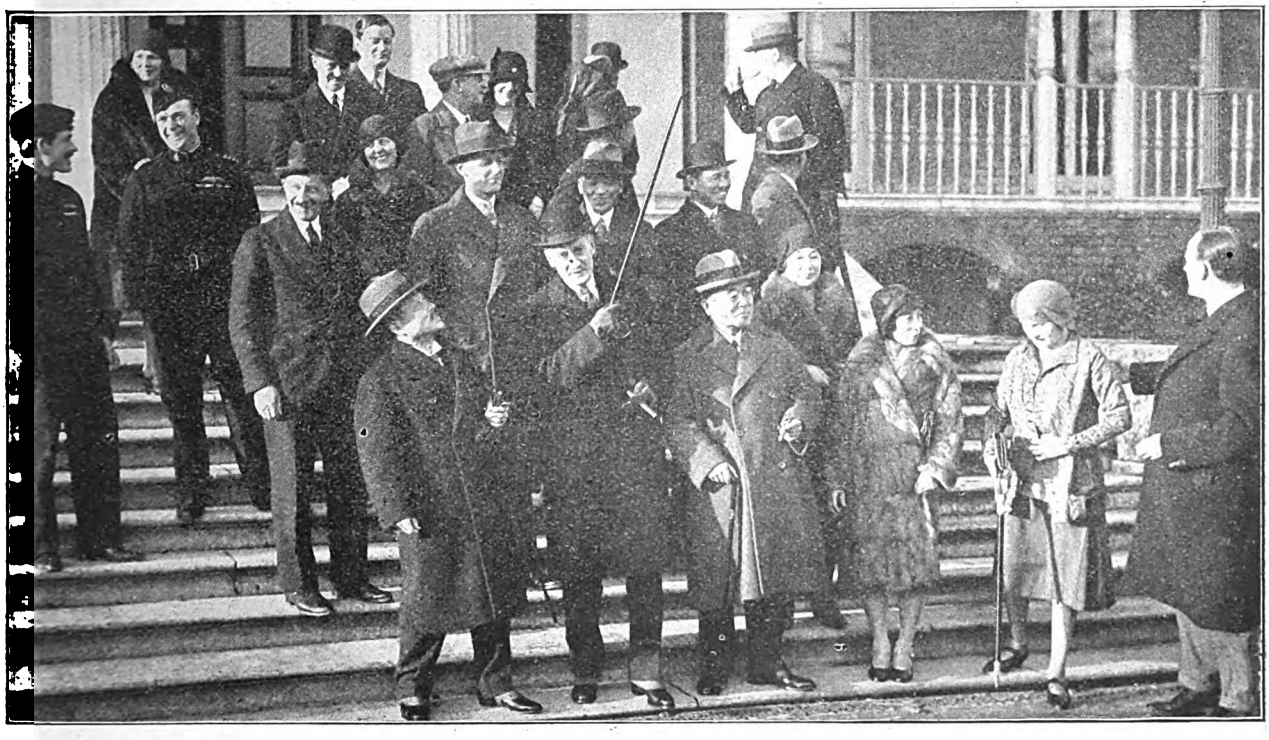
The Royal Aero Club are considering making Haldon one of the stopping places in the King's Cup Race.

KARACHI—DELHI—KARACHI.

Two native members of the Karachi Aero Club, R. N. Chawla and a mechanic, have flown from Karachi to a place called Montgomery, about 200 miles north and 500 miles west of Delhi. Thence they flew to Delhi itself,—at which place apparently they were aiming originally. Afterwards they returned to Karachi.

Whether their navigation was faulty or whether they followed the railway to avoid crossing the Thar or Bikanir desert is not clear. In any event, the distance is about 1,800 miles in all.

This journey was made between Jan. 7 and Jan. 12 in a D.H. Gipsy-Moth, and is a record for native aviators.



AT HANWORTH.—Lord Thomson (with stick) in middle; Col. the Master of Sempill and the Hon. Mrs. Forbes-Sempill on extreme right; Flt. Lt. the Hon. J. H. Rodney, and Mr. Neville Stack (in uniform) and Lt.-Col. Ivor Edwards on left.

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INTERESTING MOTH ORDERS.

During the past few days the Company has received orders for Gipsy Moths from:—

(a) *The Compania Espanola de Aviacion,* a concern which operates the largest and most important flying school in Spain, and uses several different types of aircraft. The present addition comprises two Gipsy Moths for elementary and advanced aerobatic training.

In spite of the great distance this flying school has taught in the past most of the South American pilots who have been sent over to Europe to be trained.

(b) The Baron de Précourt, a director of the French Schreck Aeroplane Company.

M. de Précourt has been flying for many years and held high rank in the French Air Force during the War. He already owns a Schreck monoplane, a Morane monoplane (200 h.p. Salmson) and a resplendent Bugatti car.

(c) Mr. C. P. Parkerson, a prominent member of the flourishing Cinque Ports Flying Club, who has ordered a Gipsy Moth which he intends to fly to Australia.

MR. CHICHESTER RESUMES.

THE AEROPLANE for Jan. 1 of this year reported the misadventure of Mr. Francis Chichester when he was forced to land in some salt marshes near Tripoli on Dec. 21.

Mr. Chichester has started again and on Jan. 14 had reached Karachi. He was at Calcutta on Jan. 16 and on Jan. 17 he reached Rangoon. On Jan. 18 he reached Singapore, and Batavia on Jan. 20.

A WATCHMAN'S SURPRISE.

Although the De Havilland Works, at Stag Lane, were shut for nearly a week over the Christmas holidays, watchmen were on duty day and night.

On Boxing night, when most people may be presumed to have been enjoying themselves, the watchman on duty looked across the aerodrome at 03.00 hrs. (the night was extremely light) and saw a huge 500-gallon petrol-tank, sunk in the ground near the Repair Depot, heave itself bodily out of the ground.

This was a bit too much for him and he forthwith telephoned to the Plant Engineer, who lives some miles away. The engineer replied what he might have been expected to reply, but as the watchman was insistent he consented to come along and investigate the apparition.

The explanation was that the tank had been sunk in the ground only three days before and the heavy rains had run underneath the concrete foundations before they had become set and had hove it out of the ground.

The watchman is now back on duty, but has to take things quietly.

TO INDIA.

On Jan. 13 at 8.00 hours Mr. H. R. Law, son of the late Mr. Bonar Law, in a Widgeon, left Lympne for India.

Reports from Athens dated Jan. 17 state that Mr. Law had a forced landing at Aghios Andreas and slightly injured his head. This place is on the Gulf of Corinth near Itea. Delphi, of oracular fame, is not very far away.

The machine is to be towed to the Piræus, the port of Athens, and there mended.

A CHAPTER OF ACCIDENTS.

On Jan. 18 a machine belonging to Mr. A. J. Stevens crashed at Addlestone. The machine was being piloted by Mr. Rutz Rees. Both pilot and passenger were injured and are now in Weybridge Hospital.

On the same date Mr. Philip Noble crashed at Heston, he was flying a D.H. Moth owned by Airworks Ltd. Reports state that he was in a spin and although he managed to pull out, he was too close to the ground and hit it. The machine was wrecked but Mr. Noble was unhurt.

On Jan. 20 Sir Ahmed Hassanein Bey, First Chamberlain to King Fuad of Egypt, was starting from Heston Air Park for Egypt. He tried to take off with a sideways swing and pulled off a tyre, and the machine pitched on its nose, and smashed the airscrew.

By 12.50 hrs. however the tyre and airscrew had been replaced. Sir Ahmed then left for Lympne, where he was to stay the night.

His machine is the famous D.H. Moth G-EBTD on which the record-breaking total of 600 hours' flying without overhaul was made. The engine is the same, but it has been overhauled for this venture.

DR. GEORGII ON GLIDING.

As all gliding enthusiasts ought to know, Dr. Georgii, the Director of the Research Institute of Darmstadt Technical University, is lecturing before the Royal Aeronautical Society on Feb. 19, at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, at 18.30 hrs.

The lecture will be arranged under twelve heads. (1) The history of the subject. (2) Objects of the movement, namely, research, sport and flight tests of new types as opposed to wind-tunnel tests. (3) Load factors, folding and detachable wings, landing gear and similar questions, will be discussed under the heading of design. (4) Rate-of-climb meters, and instrument equipment. (5) Construction, under which the lecturer will discuss the use of materials other than those generally used for aeronautical construction. (6) The desirability of design approval by a competent authority. (7) The operation of gliders. (8) Suitable terrain. (9) Meteorology. (10) Insurance. (11) Towed gliding. (12) Possible future developments.

With Dr. Georgii will be Herr Stamer who will give a short account of his experiences and show a film of gliding in Germany.

This complete treatment of the subject will give those who wish to start the sport in England a large amount of valuable information.

FORCE OF HABIT.

A fund for promoting the Art of Gliding in this country has been headed by a subscription of £1,000 from Lord Wakefield of Hythe.

This magnificent example ought to be followed by others who have the future of British Aviation at heart. The British Gliding Association has already received many subscriptions. Further donations should be sent to the Hon. Secretary, Mr. L. F. Howard Flanders, c/o The Royal Aeronautical Society, 7, Albemarle Street, W.1.

HESTON'S LATEST.—An all-metal Blackburn Bluebird (Gipsy) built by Saunders-Roe Ltd. and lately bought by Airwork Ltd.—(*"Aeroplane" photograph.*)

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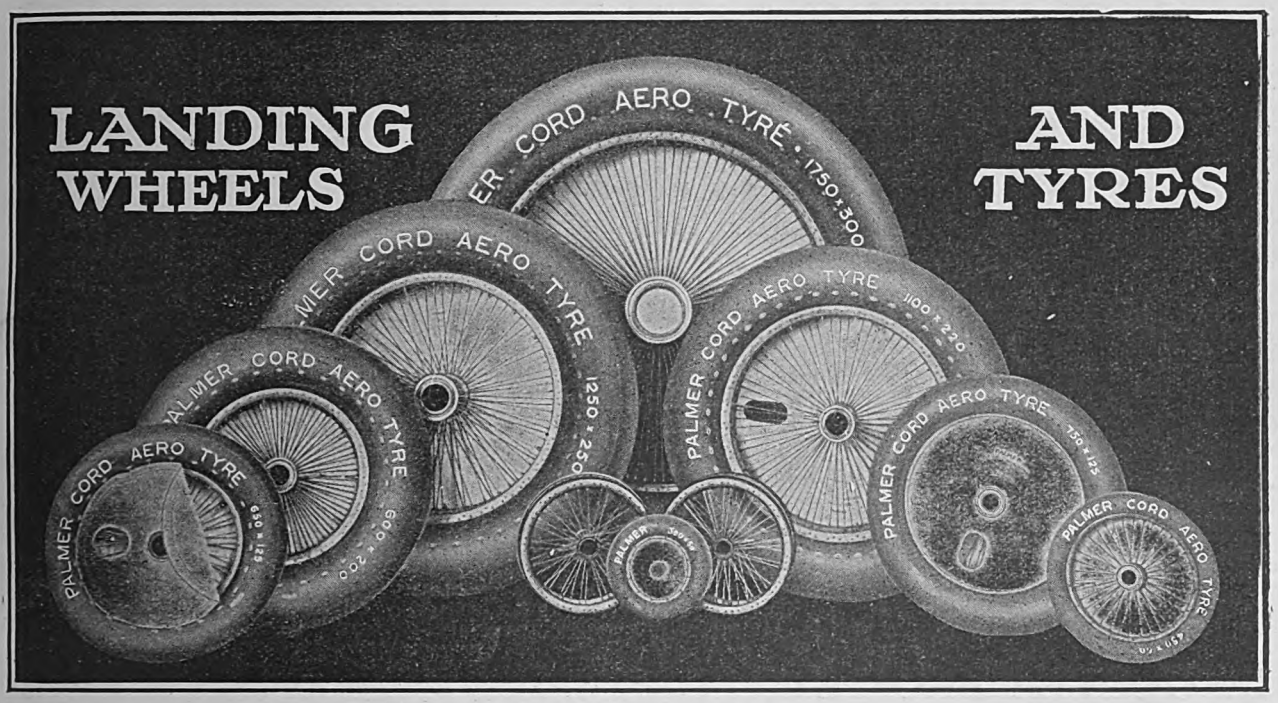
PALMER



STANDARD SIZES.

Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
375×55	168	111.12	25.4	Central
,,	195	130.	38.09	Central
300×60	16	111.12	25.4	Central
450×60	30	89.	31.75	Central
,,	172	130.	38.09	Central
575×60	21	160.	28.	Central
,,	180	150.	38.09	104/46
,,	186	120.	34.92	Central
,,	190	150.	38.09	Central
600×75	21	160.	28.	Central
,,	180	150.	38.09	104/46
,,	186	120.	34.92	Central
,,	190	150.	38.09	Central
700×75	78	178.	44.45	132/46
,,	79	178.	44.45	Central
,,	100	178.	38.09	132/46
,,	101	178.	31.75	132/46
,,	196	178.	55.	Central
600×100	188	120.	34.92	Central
,,	304	150.	38.09	104/46
,,	333	120.	34.92	Central
700×100	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	95	185.	55.	Central
,,	99	178.	38.89	132/46

Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
700×100	112	150.	38.09	Central
,,	176	178.	44.45	Central
,,	179	178.	55.	132/46
650×125	119	178.	55.	132/46
,,	147	178.	55.	Central
,,	188	120.	34.92	Central
,,	336	178.	44.45	132/46
750×125	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	95	185.	55.	Central
,,	99	178.	38.89	132/46
,,	112	150.	38.09	Central
,,	176	178.	44.45	Central
,,	179	178.	55.	132/46
800×150	161*	185.	55.	135/50
,,	162*	185.	55.	Central
,,	163*	185.	66.67	135/50
,,	169†	185.	55.	135/50
,,	177	185.	55.	135/50
,,	183	185.	55.	Central
,,	211*	185.	60.32	135/50
1000×150	167	185.	55.	125/60
,,	174	250.	80.	Central
,,	182	185.	55.	Central
,,	187	220.	66.67	Central
,,	201	185.	60.32	125/60

Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
1000×150	210	185.	60.32	Central
1000×180	148	220.	80.	Central
,,	149	185.	55.	Central
,,	155	220.	66.67	Central
,,	166	185.	55.	125/60
900×200	107	185.	55.	Central
,,	108	185.	55.	125/60
,,	128	220.	66.67	Central
,,	137	250.	80.	Central
,,	157	185.	80.	Central
,,	202	185.	60.32	Central
1100×220	134	220.	66.67	Central
,,	136	250.	80.	Central
975×225	192	185.	60.32	Central
,,	194	185.	55.	125/60
1100×250	364	220.	60.32	Central
1250×250	314	250.	80.	Central
,,	154	304.8	101.6	Central
1500×300	305	304.8	152.4	Central
,,	306	304.8	101.6	Central
1525×325	197	304.8	101.6	Central
1750×300	190	400.	152.4	Central
,,	191	350.	150.3	Central
1750×350	193	400.	125.	Central
2000×450	363	500.	152.4	Central

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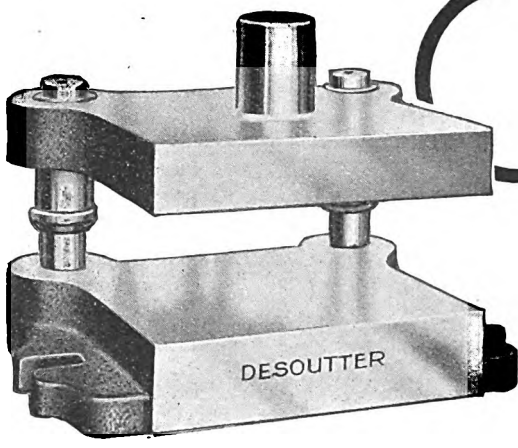

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COMMERCIAL AERONAUTICS.

DEVELOPMENT IN FRENCH AIR TRANSPORT.

The necessary agreements between the French air transport companies in connection with the Government's scheme for merging the air services into three systems have now been drawn up and laid before the Chamber of Deputies. Those responsible do not expect to be able to bring the relative bills up for discussion before next May. The proposal is to divide French Air Transport into three systems—Eastern, Continental and Western.

The agreement for the "Eastern" system, which will be effective for 30 years, involves the amalgamation of the *Air Union* and the *Air Union Lignes d'Orient* and provides for the operation of air transport on the lines Paris—London, Paris—Lyon—Marseilles, Marseilles—Tunis, Marseilles—Athens—Syria, with later extensions to Indo-China and the Far East on the one hand and Egypt on the other.

The capital of the new company is fixed at 60,000,000 francs (£483,480) to be held as follows: 25 per cent. by the *Cie. Air Union;* 25 per cent by the *Cie. Air Union Lignes d'Orient;* 25 per cent. by the P.L.M., Etat and Nord railways, shipping companies, leading banks, etc.; 25 per cent. by the French Government.

A subsidy will be paid to the company in the form of a kilometre bonus, the rate of which will be calculated according to the h.p. and type of aircraft and the zone in which the service is operated. The total subsidy for 1930 is fixed at 56,000,000 francs (approx. £450,000) and for 1931 at 74,000,000 francs (approx. £600,000).

Thereafter the amount will be gradually reduced. The reduction at the end of five years will be 10 per cent., at the end of ten years 30 per cent., at the end of fifteen years 50 per cent., at the end of twenty years 70 per cent., and at the end of twenty-five years 85 per cent.

Up to 50 per cent. of the aircraft used may be of foreign construction,—an excellent provision to guard against stagnation in French design.

The agreement for the "Continental" system, which will consist of services from Paris to the European capitals, involves the amalgamation of the *Cie. Internationale de Navigation Aérienne* (C.I.D.N.A.), the *Cie. Générale de Transports Aériens* (*Lignes Farman*).

The capital of the new company will be 60,000,000 francs (£483,480) which will be allocated in the proportion of one-third each to the C.I.D.N.A., the Farman Company and the Government.

The terms of the agreement are almost identical with those relating to the "Eastern" system, except that the maximum annual subsidy is fixed at 48,550,000 francs (£391,220).

The "Western" system will be sub-divided into South American and African divisions, the former to be operated by the *Cie. Générale Aéropostale* and the latter by a new company known as the *Cie. Transafricaine.*

The latter company has been formed with a capital of 6,000,000 francs (£48,350) divided equally between the *Cie. Générale Aéropostale* and the *Cie. Air Afrique*, which company was formed in 1928 by Commandant Dagnaux for the operation of air transport in Africa. Commandant Dagnaux will be Managing Director of the *Cie. Transafricaine.*

Details of the agreements between the Government and the two companies to operate the "Western" system are not yet known except that both will be valid for 20 years.

In the meantime the *Cie. Générale Aéropostale* continues to develop its system with a view to connecting up North America with Europe. From Port Natal, Brazil, which is the starting point for their South American air-line to Buenos Aires, a line will be run through Venezuela to North America by way of the West Indies. The Venezuelan Congress has already voted grants for a line to Europe by this company.

A new air-line, which involves crossing the Andes at a height of 16,400 ft., has been operating between Buenos Aires and Santiago de Chile since July, 1929. An agreement has been concluded between the Chilean Government and the Aéropostale Company which guarantees that the company shall carry half the mails for Bolivia, Peru and North America over a period of five years.

The company formerly known as the *Société d'Etudes et d'Entreprises d'Aviation en Indo-Chine et en Extrême-Orient* has been renamed the *Cie. Air-Asie*, and, as the result of the agreement with the *Air Union* and the *Air Union Lignes d'Orient* for the operation of the "Eastern" system, it has been appointed to act as a branch of the new company in the Far East.

This company is studying the question of special air connections with French Indo-China from Pitsanoulok to Saigon by way of Bangkok, Angkor and Pnom-Penh, from Saigon to Luang-Prabang by way of Kratie, Savannakek and Hong-Khay, and from Saigon to Hanoi by way of Dalat, Nha-Trang, Tourane and Vinh. Experimental flights have been made and an agreement has been signed with the Siamese Government, and negotiations with the Government of Indo-China are far advanced.

[The whole arrangement seems well-considered, but it lacks the spur of competition. It has not the basic evil of monopoly of Government support, which is the basis of all criticism of Imperial Airways, for the Government can, at any rate, compare the running costs of these four different managements to give a comparison of efficiency, and that is a form of competition. But direct competition on each route would lead to still higher efficiency.—C. G. G.]

CO-OPERATION WITH FRANCE.

Speaking at a banquet of the British Chamber of Commerce in Paris on Jan. 9, Lord Thomson, Secretary of State for Air, said that in Commercial Aviation it was a case of get on or get out. Only the best machines, the most trustworthy pilots and the most complete ground organisation were compatible with safe flying.

Together with M. Eynac, the French Minister of Aviation, he had explored Africa, Arabia, and the farthest East, and everywhere they had found that their activities could be profitably combined. They had discussed the future, and between them had planned a web of air communications, covering more than half the surface of the globe, whose civilising influence could only serve to stimulate the growth of Franco-British trade.

ANOTHER PROBLEM FOR THE INDIAN GOVERNMENT.

On Jan. 17 Commandants Girier and Weiss left Istres, near Marseille, at 09.00 hours in an attempt to reach Pondicherry, India. They reached Tunis non-stop at 13.35 hrs. the same day.

They are using a Bréguet-Bidon (600 h.p. Hispano-Suiza) and hope to do the flight in the shortest number of hops. This flight is all part of the French programme for a system of long distance mail routes.

Naturally the question arises as to what the Indian Government will do about it. Having forbidden the Netherlands Government to run its air mails across India, can it stop the French Government from flying to its own possessions in India.—People are rather apt to forget that France owns part of that sub-continent which is generally coloured all-red on the maps.

Surely any prohibition of flying over a country is equivalent to forbidding the use of territorial waters and harbours. And that may reasonably be reckoned as a declaration of war.

KARACHI—RANGOON.

A further step towards the extension of the Air Mail from Karachi towards Australia has been made. The Committee of the Indian Government concerned with this problem has approved a provision of £45,000 in the Budget for a State Air Mail between Delhi, Calcutta, and Rangoon.

This money is to be spent partly on ground organisation, especially in Burma, and partly on aeroplanes. The Indian Government is to recruit British commercial pilots on a two years' agreement,—after which presumably they will be replaced by coloured pilots. (Mr. Man Mohan Singh's navigation from London towards India is not an encouraging symptom.)

The air mail route from Karachi to Delhi has already been taken over by Imperial Airways under a charter for two years. The route towards Australia is thus slowly making headway.

THE ITALIAN POINT OF VIEW.

As was reported in THE AEROPLANE for Jan. 15 the Indian Air Route no longer goes by way of Genoa and Crete to Tobruk and Alexandria, but by way of Athens and Crete.

The Italian point of view is contained in a report from the Rome correspondent of *The Daily Telegraph*, who says:—

A semi-official explanation has been issued here regarding the abandonment of the Italian portion of the Imperial Airways service to India.

According to this statement Great Britain saved 50 per cent. on the trans-Mediterranean service as a result of the agreement whereby the service on the Genoa—Alexandria section was carried out in collaboration with Italy.

When the Socialist Government came into power, the statement

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continues, the Italian authorities observed that not only was the general agreement reached at the beginning of the negotiations not being carried out, but the arrangements made with regard to the respective shares were categorically denied. In consequence Italy was obliged to break off the negotiations.

So far as the seaplane service from Genoa to Alexandria is concerned, no incident has occurred to interrupt the regular working of the Italian portion, whilst the British service, it is declared, has given rise to accidents and complaints, to which the British Press has continually drawn attention.

This should be read in conjunction with the comments published in THE AEROPLANE of Jan. 15. Of course passengers are not lost in accidents when there are no passengers. And one seems to remember reading of several accidents to Italian flying-boats in the Mediterranean or Ægean or Adriatic or Marmora, or somewhere thereabouts lately.

THE AIR-DOGS.

The Guild of Air Pilots and Air Navigators of the British Empire have had the pleasure of accepting Mr. Alexander Duckham's offer of a Loving Cup to the Guild, which offer was duly recorded in THE AEROPLANE of Jan. 1. One gathers that projected designs have been sent to the Guild and that they are very much appreciated.

Incidentally, the party given at the Edibel Cinema Theatre by the Guild to see the Blériot film, as was duly notified in THE AEROPLANE of January 1, was a great success. The little theatre was packed, and the friends and relatives of the members of the Guild enjoyed the show heartily.

AIR NAVIGATION REGULATIONS.

Air Ministry Notice to Airmen No. 2 of 1930 draws attention to the necessity for pilots and other persons engaged in air traffic over Great Britain and Ireland keeping themselves familiar with air navigation regulations.

The notice details the regulations at present in force. There are twenty-four, and their total cost is five shillings and twopence. They may be obtained from H.M. Stationery Office or THE AEROPLANE Book Dept., Cannon House, Pilgrim Street, Ludgate Circus.

AMERICAN AIRCRAFT IN THE EAST INDIES.

The Curtiss Aeroplane Export Corporation of New York City has received an order for eight Curtiss Hawk single-seat pursuit biplanes (600 h.p. Curtiss Conqueror engines), complete with spare engines and aeroplane and engine parts, from the Netherlands East Indian Government. The total value of the order is $250,000 (£50,000).

OPPORTUNITIES IN WESTERN CANADA.

Mr. J. W. A. Legge-Willis, who was in this country during the Aero Show fixing up agencies, has now registered Dominion Marine Supplies Ltd., at 1363, Pender Street, West, Vancouver, B.C. He holds the Canadian agency for Essex Fire Extinguishers besides various marine engines and a well-known make of motor-cycle. Firms in this country who want a representative, especially in Western Canada, will do well to get in touch with him.

PROGRESS WITH MUNICIPAL AERODROMES

Hereafter follows a list of cities and towns in Great Britain which are taking an active interest in the laying out of municipal aerodromes:—

(A) Cities and towns at which licensed aerodromes exist: Blackpool, Hull, Nottingham, Wythenshawe, Manchester. Total, 5.

(B) Cities and towns which have bought ground for aerodromes: Bristol, Carlisle, Liverpool, Manchester, Plymouth, Stoke-on-Trent, Ipswich, Sheffield. Total, 8.

(C) Cities and towns which are negotiating for land: Burton, Cardiff, Hastings, Hereford, Portsmouth, Southampton, Southend, Worcester, Middlesborough. Total, 9.

(D) Cities and towns which have reserved sites in their town-planning scheme: Basingstoke, Morecambe, Skegness, York, Littlehampton. Total, 5.

(E) Cities and towns at which sites have been inspected: Aberdeen, Bognor, Bournemouth, Birmingham, Bradford, Brighton, Belfast, Bedford, Chester, Crewe, Cheltenham, Chorley, Derby, Gloucester, Gateshead, Glasgow, Greenock, Hastings, Inverness, Kidderminster, Leeds, Leicester, Maidstone, Newton Abbot, Northampton, Rotherham, Scarborough, Southport, Swansea, West Bromwich, Wolverhampton, Worthing, Wellingborough, Walsall. Total, 34.

(F) Cities and towns awaiting inspection of sites: Abergavenny, Blythe, Doncaster, Gravesend, Huddersfield, Leek, Lytham-St.Annes, Norwich, Poole, Falkirk, Wombwell, Newport. Total, 12.

(G) Cities and towns which are showing active interest: Alloa, Bolton, Burry Port, Coventry, Darlington, Dover, Dunfermline, Durham, Edinburgh, Eastbourne, Exeter, Gillingham, Grantham, Haywards Heath, Hebburn, Haverfordwest, Jarrow, Loughborough, Newcastle, Peterborough, Sunderland, South Shields, Salisbury, Shrewsbury, Stratford, Walton-on-Naze, Weymouth, Warrington, Winsford, Yeovil. Total, 30.

Grand total, 103, cities and towns in Great Britain which are showing active interest in developing air transport.

A PIONEER AIR MAIL.

[*A Pioneer British Air Mail, Bath—London,* 1912. By A. E. Hopkins, supplied by THE AEROPLANE Book Department, Cannon House, Pilgrim Street, E.C.4. 2s. 9d. post free.]

Philatelists and others will be interested in this little book, which describes a flight made from London to Bath by the late Mr. B. C. Hucks with a letter from the Lord Mayor of London to the Mayor of Bath. On his return journey Mr. Hucks carried about 600 post-cards from residents at Bath which he undertook to post on arrival at Hendon. The cards bore a small label signed by the aviator and are now of considerable interest to collectors. Mr. Hopkins's book has been carefully compiled and has some interesting illustrations.

KENYA AND BACK.

This is from *The Times* of Jan. 21:—

Captain F. E. Guest, who is the chairman of National Flying Services, left England last year with the avowed intention of exploring the possibilities of civil aviation in East Africa. He is now on his way back. Our Nairobi Correspondent reports that Captain Guest is believed to have found that there is no sufficient call at present for commercial services which would warrant his company exploiting East Africa, but that another two years may disclose better possibilities.

Sq. Ldr. the Right Hon. F. E. Guest seems to have been unlucky in his choice of country. Before he went there the possibilities had been well explored by Capt. Gladstone, Sir Alan Cobham, Mr. Tymms and others. Arrangements had already been made for Imperial Airways to run through to the Cape. And Mrs. Wilson had already organised the Wilson Air Lines, with Mr. Campbell Black and Flt. Lt. Swoffer as her chief aids.

Consequently all the pioneering work seemed to have been done, and his disappointment at finding that there was more pioneering to be done is understandable. His prospective task was not made any easier by his unfortunate remark, when he arrived, to the effect that he and his team of pilots had come to undo the harm which had been done by amateur pilots in Kenya in the past. As the said "amateurs" included some of the best pilots in the Empire the remark did not arouse enthusiasm locally.

A BREAKAGE AT BROKEN HILL.

According to a Reuter telegram the Giant-Moth, *Youth of Britain,* crashed at Broken Hill, Northern Rhodesia, on Jan. 19. The pilot, Mr. Woolley Dod, of Imperial Airways, was unhurt, but a passenger and two mechanics were slightly injured.

As reported in THE AEROPLANE for Jan. 15 Sir Alan Cobham handed over the *Youth of Britain* to Mr. Woolley Dod who was to fly it back to England after he had finished the survey of the Imperial Airways route to the Cape, in conjunction with Mr. F. Tymms of the Air Ministry and Capt. Gladstone of the Blackburn-Cobham combination.

ANOTHER CALCUTTA LEAVES ROCHESTER.

On Jan. 15 the fifth Calcutta (three geared Jupiter engines) left Rochester. This machine is the fourth delivered to Imperial Airways. Mr. Donald Drew was the pilot and is flying the machine down to the Mediterranean.

Short Bros. must now consider the Calcutta quite a quantity-production job, as they have completed five and are building more. A fifth for Imperial Airways is to be delivered at the end of March. The brief delivery time needed by the firm for these big flying-boats is amazing.

AERO-ENGINE DEVELOPMENT.

The World-famous Baldwin Locomotive Works is expected shortly to announce that it will begin the manufacture of aircraft engines for the General Motors Corporation. Nothing is known about the probable type of engine that the company will make but it has been definitely announced that it is experimenting with the Diesel type for all sizes of engines and this includes aero-engines.

The Société Anonyme des Automobiles et Cycles Peugeot of Paris has acquired the licence for the Junkers heavy-oil engine for France and its Colonies.

AVRO ENTERPRISE.

Three highly attractive booklets have been issued by A. V. Roe and Co. Ltd., to advertise their civil aircraft. The first of these describes the Avian, the second the Avro Five and the third the Avro Ten.

The Avian booklet is contained within an attractive blue and black cover. Inside there is a foreword drawing attention to the international demand for this machine.

Next come two pages of specifications, each headed with a good photograph. One page is devoted to the Avian with a Genet Major engine, the other to the Avian with a Cirrus Hermes.

The remainder deal with the structural and aerodynamic features of the Avian. At the head of each page is a good clear photograph emphasising some important feature such as the wide-track divided long-travel undercarriage or the unusual luxury, for a light aeroplane, of a tailplane adjustable in the air.

The Avro Five booklet has a striking decorative cover showing two Fives speeding across the sky. The Foreword

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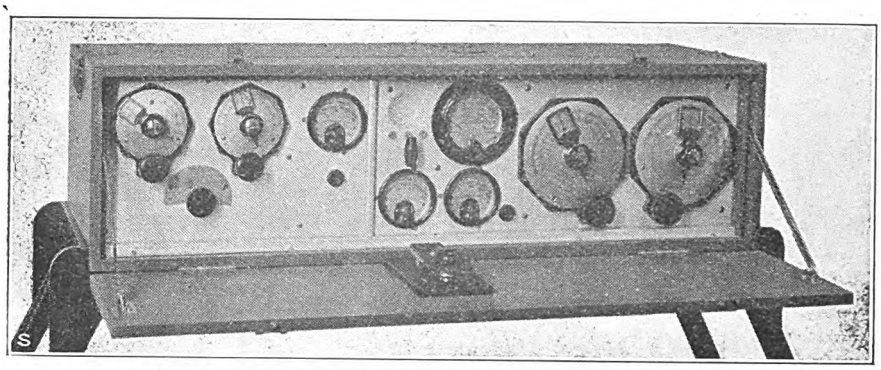

WIRELESS FOR THE SURVEY PARTY.—The Graham wireless set type G.A.3, which is being used by the Aircraft Operating Co. Ltd. in Rhodesia.

is addressed to men with a diversity of interests scattered abroad or over a continent. To such men the Avro Five offers a means of saving time and energy which would otherwise be dissipated in travelling by the usual means.

This booklet is well illustrated with photographs, some of them taken by THE AEROPLANE's photographer. Besides the usual specifications the booklet contains some useful operational data which give the cost per ton mile. A prospective buyer can at once see the cost of carrying any specific freight for a given distance.

The booklet describing the Avro Ten has an illustrated cover which must now be familiar with the slogan "Through frozen skies and under tropic suns" to people all over the World and especially those who read THE AEROPLANE, for this illustration is a reproduction of the picture which has been advertising the Avro Ten so effectively.

This booklet too is full of good illustrations, useful data and specifications. Particularly one would draw attention to the closing sentence which refers to maintenance figures for the Armstrong Siddeley Lynx with which engine the Avro Ten is fitted.

The reference is to the experience acquired by Armstrong Siddeley Motors Ltd. in the use of Lynx engines all over the World.

"These costs vary according to conditions of operation, but the benefit of this exceptional experience in the form of guaranteed figures for known conditions is placed at the disposal of purchasers by the Avro Company."

A particularly attractive feature is the double-page part-sectional perspective drawing of the Avro Ten by Mr. Max. A. Millar which gives a remarkably clear idea of the various Avro Ten features and details.

The publicity department of A. V. Roe and Co. Ltd. deserve to be congratulated on the excellence of their propaganda.

WIRELESS IN THE BUSH.

THE AEROPLANE of Dec. 11, 1929, reported the signing of a contract between the Aircraft Operating Co. Ltd. and the Government of Northern Nigeria for the aerial survey of 63,000 sq. miles.

The ground organisation of such a survey requires that various ground survey parties be sent out from the base to fix certain points. From such points and their relation to each other or to the base the aerial survey is properly correlated.

These parties are of necessity quite out of touch with their base and with each other. They are generally in isolated or remote spots in difficult and roadless country.

To overcome these conditions and provide intercommunication, Alfred Graham and Co. Ltd. of Slough working in close touch with the Aircraft Operating Co. Ltd., have produced a light portable short-wave wireless equipment, known as type G.A.3.

This set has now been in use by the Aircraft Operating Co. in Rhodesia for some time. It is light, robust, and of really useful range.

The transmitter is for telegraphy only, to keep the weight low. The wave range is from 20 to 100 metres. The set will receive the ordinary short-wave broadcasting and has an adapter for receiving the international long-wave time-signals. Tests recently made at Slough show that two-way communication can be obtained up to 1,200 miles.

The set consists of the combined transmitter and receiver unit weighing only 22½ lbs. (which is shown in the photograph), aerial, charging unit, accumulator, high tension unit and box of spare parts. The aerial is slung over two 14 ft. portable spars placed about 30 feet apart. The accumulator is of the Alkali type which stands up to the roughest treatment.

There are three particularly outstanding features of the set. The whole station can be unpacked, erected and put into action in less than five minutes by one man.

Secondly there are no high-tension or grid-bias dry-batteries to deteriorate rapidly under tropical conditions. The receiver is supplied with high-tension current by means of a converter directly from the accumulator.

Thirdly there is the robust construction, which makes the set ideal for survey conditions. At the same time the parts are remarkably light. This is an important point when everything has to be carried on man-back (or head).

There seems to be little doubt that the advance-guards of civilisation all over the World, the surveyors, the bridge-builders, the rail and road builders, canal and river engineers will find this set of great value.

Lastly there are those who are opening up the latest of transport routes, the air lines. Like an army which marches on its stomach, so the air line is made or marred by its aerodromes. Builders of these aerodromes across new country will require, with the others, the Graham Portable Short Wave Equipment type G.A.3.

CROYDON NOTES.

Mr. G. Duncan Fletcher's excellent letter in THE AEROPLANE of January 8, in which he defends his friend, Mr. Campbell Black, was read with much interest.

Mr. Black, it will be remembered, was reported missing between Lympne and St. Inglevert, some time ago, in stormy weather, and it was feared he was in the ditch. This was due to the fact that though he was reported passing over Lympne, no report of his arrival at St. Inglevert was received. Inglevert, in fact, insisted that he had not circled that aerodrome.

Mr. Fletcher says Inglevert was circled at 1,000 ft. (in stormy weather), and since he mentions no subsequent circling at a lower altitude, it may be assumed one circle only was made, at 1,000 ft.

When he was reported over Lympne and reported to Croydon, Inglevert should have received the message automatically and should thus have been on the alert for him.

Under these circumstances, it is difficult to imagine that the guardian of that sacred fane slept or was a-hunting (with fusil for foxes and string-bag to put corpses in, French style), but in any case, it was the obvious duty of a pilot who had circled Lympne to make every effort to attract the attention of Inglevert, and he should have continued to circle (within reason) until he received some answering ground signal, showing he had been observed. If, after every effort, Inglevert still slept, then Mr. Black should have put in a strong report about it to the British Air Ministry.

[Mr. Black did in fact circle St. Inglevert more than once, at 500 ft., as well as at 1,000 ft. But seemingly it was during the sacred hour of the *déjeuner*, when nothing known to science will attract a French *officiel* from his soup. After that Mr. Black was too busy getting to Kenya to bother about complaints to the Air Ministry.—ED.]

Doubtless they would have approached their French colleagues through diplomatic channels, inquiring:—

(a) If officials on duty and expecting aircraft had authority to hunt the fox, and

(b) If so, why this was done in a low-crowned bowler hat, with a sawed-off shot-gun when it should have been per-

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formed "on ze great orse, with ze leetle fox-dogs, ze 'orn and ze coat pink."

Eventually to the great glory of Civil Aviation, the official might have been warned only to hunt the rabbit, armed with the warming pan of his aunt and clad in the cloth cap of the gardener.

In other words, it is no use circling Lympne and being reported as heading across Channel and then failing to make sure that you are reported on the French side. So if you get no response on the French side, play Hell about it, loud and often.

To last week's sartorial note about summer suitings, one ought to have added some remarks about a certain cerise shirting, which, if its wearer had not been leaving the country anyhow, would infallibly have led to his expulsion. Said to have been specially constructed of flannelette as a Yuletide gift to its pilot-owner from an admiring Board of Directors, this garment has been responsible for several scares of fire in places where pilots sing, but the wearer, true to his salt, has insisted on wearing it next his heart, except for an all-wool vesting, ever since Christmas.

Another seasonal touch has been added to Aerodrome fashion by Mr. Ruffy Scrobinson's new plus fourings (by Knicker, Bocker, Bags, Bloomer and Co., Threadneedle Street).

With the garments, Mr. Scrobinson has adopted a peculiar walk, described as hop, skip and scratch, thought to be attributable to the hairy homespun tickling his legs.

One of the Imperial pilots recently observed vast flocks of what he took to be the lesser pin-toed flittermouse, flying across the Channel towards Gaul. Although these birds are not usually migratory, it is thought that they have decided to change their habit owing to being forbidden to land at Biggin Hill for worms, and also because certain of their number doing so, inadvertently, were detained by a greater crested Adjutant bird on the grounds that a cloud, no bigger than a man's hand, obscured the Sun, and made flying dangerous and foolhardy.

Nature lovers will miss the mating song of these feathered friends in our woodlands, which, though it resembles a saxophone worked by steam, adds a distinct charm to hedgeside rambles for those who are slightly deaf.

A rumour that the Italian Exhibition wishes to exhibit the cover of last week's AEROPLANE under the title of "Trout in Troubled Waters," has no foundation.

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It ensures safety.

It cannot stall.

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The following interesting figures have been supplied by the companies concerned:—

Sabena, 1929.—London-Brussels and Brussels-London:—Passengers, 2,062; freight, 144,907 kgs.

Air Union, 1929.—London-Paris and Paris-London:—Passengers, 10,833; freight, 644,260 kgs.; kilometres, 9,468.13.

Average load per machine 55% on average capacity of ten passengers, i.e., 4.8 passengers plus 255 kgs. freight per machine.

The R.100 passed over Croydon Aerodrome on Monday morning, looking like nothing on earth, as is very right.

Several enthusiastic local people rang up to know if she would "moor" at Croydon, presumably to the Control Tower railing with a bit of string, and one gentleman demanded a pass entitling him to inspect the Croydon mooring mast. Ichabod! Ichabod! Our glory is departed.

We *had* a mooring mast constructed at vast expense, and demolished at even greater, after the R.34 had tied up to it once, or at most twice.

Anyone trying to foist another mooring mast on us would be unlucky. Why not put one up at Biggin Hill? It would not constitute a *landing* there.

How cheaply one can learn to fly with a certain natural aptitude for the game is illustrated by the case of Mr. Walters, one of Col. Henderson's pupils, who, including the purchase of his own D.H. Moth and tuition from September 1 to the present time, has just qualified for his B licence with a total outlay of £140.

Before September 1 Mr. Walters had absolutely no flying experience and recently made a wonderful night landing in fog at Penshurst, to the amazement of himself and all his friends.—SPRY.

THE LONDON TERMINAL AERODROME.

ANALYSIS OF FIGURES FOR PAST WEEK.

Trips per Day.—Sunday, 5; Monday, 18; Tuesday, 17; Wednesday, 19; Thursday, 14; Friday, 20; Saturday, 17.

IMPERIAL AIRWAYS LTD.:

London—Egypt—India: London—Le Touquet—Paris—Basle—Zurich: London—Ostend—Brussels—Cologne and return: Machines 39, passengers 199, freight 11¼ tons. India Route: Inward, passengers 0, mail 680 lbs.; outward, passengers 0, mail 739 lbs.

AIR UNION:

Paris—London: Machines 33, passengers 85, freight 7¼ tons.

K.L.M.:

Amsterdam—Rotterdam—London: Machines 12, passengers 32, freight 5¼ tons.

SABENA:

Brussels—London: Machines 12, passengers 26, freight 2 tons.

DEUTSCHE LUFT HANSA A.G.:

Amsterdam—London: Machines 12, passengers 14, freight 2¼ tons.

MISCELLANEOUS:

British machines 2, passengers 1.

Foreign machines 0, passengers 0.

Total number of trips by British machines, 41, carrying 200 passengers. Foreign machines, 69, carrying 157 passengers.

COMPARATIVE FIGURES.

Week ending Jan. 18:

Machines, 110; Passengers, 357; Crews, 299; Total personnel, 656.

Corresponding week, 1929:

Machines, 96; Passengers, 230; Crews, 185; Total personnel, 415.

Corresponding week, 1928:

Machines, 66; Passengers, 144; Crews, 119; Total personnel, 263.

Corresponding week, 1927:

Machines, 46; Passengers, 122; Crews, 76; Total personnel, 198.

Corresponding week, 1926:

Machines, 53; Passengers, 112; Crews, 61; Total personnel, 173.

Corresponding week, 1925:

Machines, 41; Passengers, 60; Crews, 54; Total personnel, 114.

Corresponding week, 1924:

Machines, 40; Passengers, 62; Crews, 62; Total personnel, 124.

Corresponding week, 1923:

Machines, 63; Passengers, 131; Crews, 123; Total personnel, 254.

Corresponding week, 1922:

Machines, 13; Passengers, 30; Crews, 20; Total personnel, 50.

Corresponding week, 1921:

Machines, 15; Passengers, 5; Crews, 17; Total personnel, 22.

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THE LONDON AEROPLANE CLUB RAFFLE.

The London Aeroplane Club is raffling an entirely new latest type metal Gypsy Moth. The draw will take place on Mar. 23, at Stag Lane Aerodrome.

The price of the tickets is 10s. each and the number is limited to 1,500. Tickets may be obtained from the London Aeroplane Club, 3, Clifford Street, London, W.1, or at Stag Lane Aerodrome.

NEW COMPANIES.

AERODROME CONSTRUCTIONS LTD.—Private company. Registered Jan. 3. Capital, £2,000 in £1 shares. Objects: To adopt an agreement with Air Commodore Duncan le Geyt Pitcher, C.M.G., D.S.O., to develop and turn to account the agencies comprised therein, to construct, and control aerodromes and landing places and grounds for aircraft, hangars, sheds, garages, lorries, trailers, beacons, direction signs, wind gauges, etc.

The directors are: Air Commodore D. le Geyt Pitcher, 10, Union Mansions, Queen's Club Gardens, W.14. Lt.-Col. J. Gourlie, Army and Navy Club, Pall Mall, S.W. (Both permanent.) Secretary: J. Gourlie. Solicitors: Holt Beever and Co., 1, Southampton Street, Bloomsbury Square, W.C.1. Registered office: 39, Victoria Street, S.W.1.

WOLVERHAMPTON AIRCRAFT CO. LTD.—Private company. Registered Jan. 6. Capital, £1,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in airships, aeroplanes, balloons, hydroplanes, motor-cars, lorries, vans, etc. The directors are: J. Whitehill, "Bridgeside," Solihull, Warwickshire. C. Wrighton, Kerrisdale, Granville Road, Dorridge, Warwickshire. Solicitors: Pepper, Tangye and Winterton, 34, Waterloo Street, Birmingham. Registered office: Waterloo House, 20, Waterloo Street, Birmingham.

WOLVERHAMPTON AVIATION CO. LTD.—Private company. Registered Jan. 6. Capital, £500 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in airships, aeroplanes, balloons, hydroplanes, motor-cars, lorries, vans, etc. The directors are: J. R. Whitehill, Bella Vista, Stafford Road, Wolverhampton, motor engineer. S. Summerfield, Twyford, Melton Mowbray, Leicester, air pilot. Registered office: Oxley Garage, Stafford Road, Wolverhampton.

W. Z. LTD.—Private company. Registered Jan. 2. Capital, £1,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in aeroplanes, hydroplanes, airships, etc.

The directors are: Sir Robert C. Witt, C.B.E., 32, Portman Square, W.1, solicitor (chairman). W. Zietz, 120, Rue de Lausanne, Geneva. L. de Loriol, Cologny, Geneva, chemical manufacturer. Solicitors: Stephenson Harwood and Tatham, 16, Old Broad Street, E.C.2. Registered office: 4 and 6, Throgmorton Avenue, E.C.2.

MORTGAGES AND CHARGES.

SAFETEX SAFETY GLASS LTD.—Further charge on freehold property in Middlesex, dated Dec. 10, 1929, to secure £1,000. Holders: Safetex Glass Holding Company Ltd., 21, Great Portland Street, W.1.

REINFORCED GLASS COMPANY LTD.—Land Registration Charge on 7A, Ross Parade, Wallington, dated Dec. 16, 1929, to secure £900. Holders: Metropolitan Provident Permanent Building Society, 2, Walbrook, E.C.4.

BRITISH INDESTRUCTO GLASS LTD.—Deposit of deeds (without instrument) on Dec. 20, 1929, of land at Dagenham, to secure £2,076 16s. 10d. Holders: Allnatt Ltd., The Stores, Earley Station, Berks.

SATISFACTIONS.

OSBORN ENGINEERING COMPANY LIMITED (formerly United Aircraft Co. Ltd.)—Satisfaction in full on Oct. 31, 1929, of two debentures dated May 24, 1917, and June 18, 1920, and registered June 6, 1917, and June 26, 1920, securing £4,000 and £5,000 respectively.

C. A. VANDERVELL AND COMPANY LTD.—Satisfaction in full on Dec. 20, 1929, of a 2nd debenture dated Dec. 31, 1920, and registered Jan. 18, 1921, securing £200,000.

PERSONAL NOTICES.

DEATH.

GALE.—On Jan. 14, killed at Stanton, Pit. Off. R. C. C. Gale, son of Mr. and Mrs. C. H. Gale, of Stuston Lodge, Diss.

MARRIAGES.

SIMOND—COLLINS.—On Jan. 16, in London, Geoffrey Frederick Simond, R.A.F., third son of Mr. C. F. Simond, C.B.E., 4, Mulberry Walk, S.W., to Sybil Mary Collins, youngest daughter of Mr. and Mrs. Alfred Collins, of 137, Holden Road, Finchley.

WHITWORTH—LEWIS.—On Jan. 14, at Bowdon, Lloyd Whitworth, A.F.C., of Ceylon, son of the late Mr. and Mrs. A. H. Whitworth, of Eccles, to Christine May, daughter of Mr. and Mrs. C. S. Lewis, of West Holme, Bowdon.

FORTHCOMING MARRIAGES.

HUNT—TUBBS.—The engagement is announced between Alfred William Hunt, R.A.F., only son of Mr. A. J. Hunt and the late Mrs. Hunt, of Melbourne, Australia, and Mary Isobel, daughter of Mr. and Mrs. F. E. Tubbs, of 4, Westwood Road, Southampton.

MACDOWELL—MEASURES.—An engagement is announced between Patrick Hopegood Macdowell, only son of Lieut.-Col. C. C. Macdowell, C.M.G., D.S.O., and Mrs. Macdowell, of 22, Cornwall Gardens, S.W.7, and Marjorie Grace (Biddy), only daughter of Sq. Ldr. A. H. Measures, O.B.E., R.A.F., and Mrs. Measures, of Manston, Thanet.

BIRTHS.

FRASER.—On Jan. 11, at Lockerley Manor, Romsey, to Hester, wife of Sq. Ldr. H. M. Fraser, R.A.F.—a daughter.

HUNTER.—On Jan. 14, at Halton Camp, to Evelyn, wife of Sq. Ldr. P. B. Hunter, R.A.F.—a daughter.

LLOYD.—On Jan. 6, at Mount Batten, Plymouth, to Nellie (Susan, *née* Jefferies), wife of Flt. Lt. K. B. Lloyd, A.F.C., R.A.F.—a son.

PAIN.—On Jan. 6, to Molly (*née* Lloyd Evans), wife of F. F. Pain, R.A.F., at Askive, Ford, Salisbury—a son.

PIGOTT.—On Jan. 13, at 19, Bentinck Street, to Phyllys (*née* Case), wife of Flt. Lt. O. R. Pigott, R.A.F.—a daughter.

ROBB.—On Jan. 12, at Vancouver, B.C., to Mary, wife of H. Boulton Robb, M.C., A.F.C.—a son.

SHEPHERD.—On Jan. 3, at a nursing home in Hitchin, to Esmé (*née* Gates), wife of Flt. Lt. G. C. Shepherd, R.A.F.—a daughter.

VAUGHAN.—On Jan. 3, at Waverley House, Bicester, Oxon., to Margaret, wife of Flt. Lt. E. S. C. Vaughan (R.A.F. retired)—a daughter.

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Air Survey Co. Ltd., 3, Grosvenor Gardens, S.W.1. (Victoria 5903.) Dum Dum, Calcutta, and Monkey Point, Rangoon.

The Aircraft Operating Co. Ltd., 8, New Square, Lincoln's Inn, London (Holborn 8131), and Bulawayo, Southern Rhodesia; Cairo, Egypt; Rio de Janeiro, South America: Contractors to the Ordnance Survey. Laboratories and Subsidiary Company for aerial photography in the British Isles. Aerofilms Ltd., Colindale Avenue, Hendon (Colindale 6183 and 6184).

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Advice given and rates quoted for all classes of Insurance.—Apply to Bray, Gibb and Co., Ltd., Aviation Insurance Specialists, 166, Piccadilly, W.1, or 14, Sherborne Lane, E.C.4. Founded 1865.

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To All Aeronautical Firms.—The specialised advertising and marketing service required in the aviation field is provided by Aeromarine Advertising Ltd., 56-57, Fleet Street, London, E.C.4. (Tele.: Central 2423.) This service is free to clients. Leading aeronautical firms use this specialised organisation, which has been built up by aviation experts. Write or 'phone.

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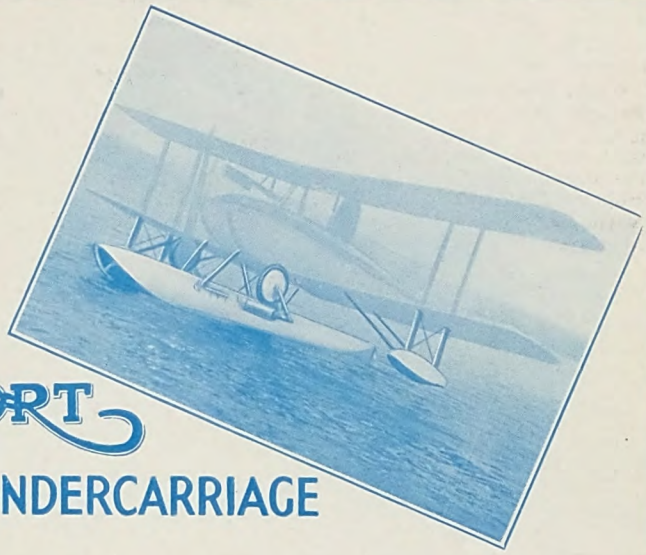

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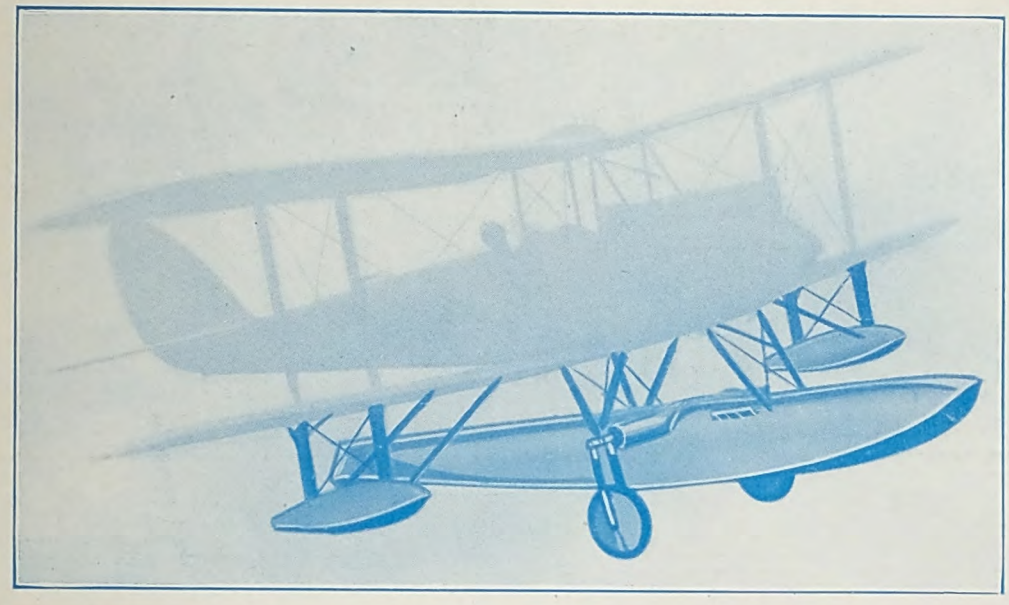

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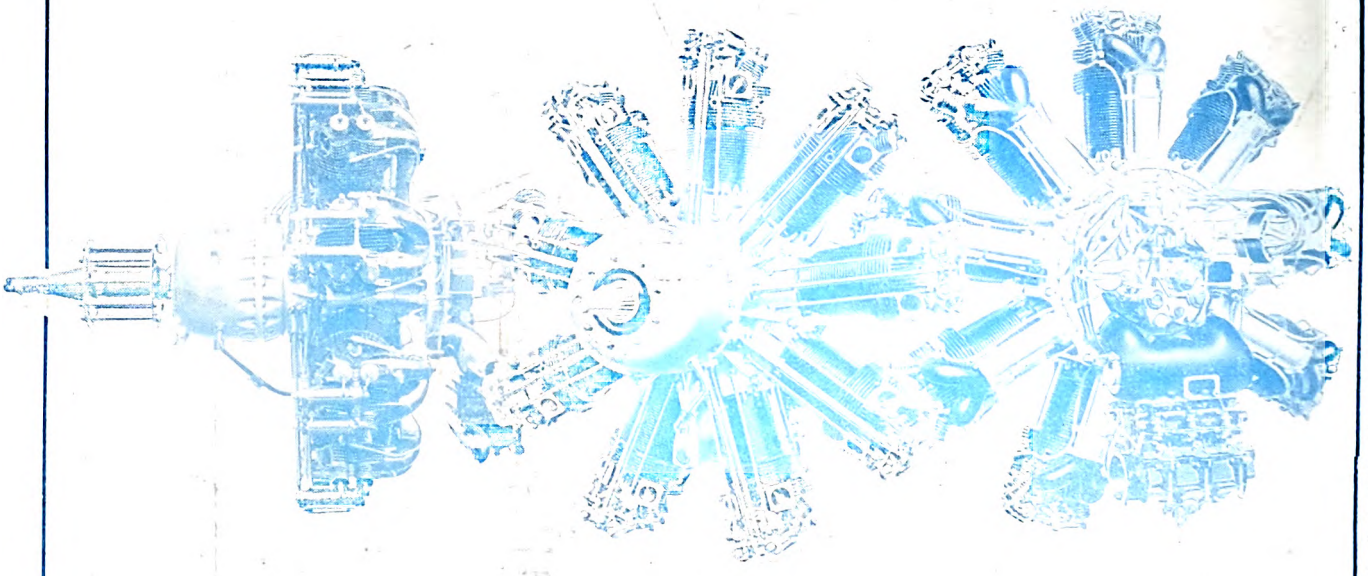

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THE AEROPLANE

6d. Weekly.

INCORPORATING AERONAUTICAL ENGINEERING

Edited by C.G.Grey

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board boat up to airships which will be ultimately considerably bigger than the largest ocean liner.

Heavier-than-air craft are not likely to attain to the size of liners, for the very good reason that the success of air transport will depend far more on frequency of service than on the number of people transported on each vehicle. That is to say, instead of having one ship a day to some distant part of the World there must ultimately be one aeroplane every few hours, and for shorter distances such as London—Paris or London—Berlin where at present we have one train or one boat at intervals of several hours, the aeroplane service will be like a tube railway service where you merely go down to the station and take the next vehicle, knowing that there will be one starting in a few minutes' time.

That is looking some way ahead. But, the shortening of that distance ahead depends very largely on the airworthiness of the craft which are to be put into use in these early days of air transport.

POPULARISING FLYING.

How soon any particular method of transport becomes popular depends to a certain extent on how long people take to become accustomed to being killed by that particular method of transport. In spite of the number of people who are killed every day in and by motor-cars nobody is ever prevented from going for a ride in a car by accidents to other people. But, in the early days of motoring, when every motor crash was given flaring head-lines in the Press, just as every aeroplane crash is to-day, people definitely were scared off motoring. And if there had been fewer accidents in those days, motoring would certainly have been popularised sooner.

Therefore, obviously, the fewer aeroplane accidents we can have in the next few years the sooner air transport will become popular, and for that reason alone some form of official certification which will guarantee the airworthiness of our aircraft seems to be worth while.

We in this country have been singularly free from serious aircraft accidents, in proportion to the amount of flying done, compared with other countries. That freedom may be due partly to the Englishman's natural aptitude as an aviator, just as our comparative freedom from accidents at sea is due to our natural aptitude as seamen.

Also it may be due to our better system of training. We have inherited our system of training from the systems organised by the Flying Services during the War 1914-18. And during the War, although a great many people were killed in training, our proportion of accidents was very much lower than that of any other belligerent nation.

But, our freedom from air accidents since Civil Aviation began has been even more due to the all-round excellence of our aircraft. For this also we have to thank our war organisation. The Aeronautical Inspection Department, which was founded by the ever-to-be-regretted Major J. D. B. Fulton, R.A., before the War, gave us the World's best aeroplanes during the War. And the A.I.D. has continued since the War to maintain our standard of quality.

Over and above that there is the fact that between them the British Manufacturer and the British Workman have always turned out the finest engineering jobs in the World. So, what with the natural pride of the Englishman in doing a good job of work, and the careful supervision of the A.I.D., we were bound to produce at the start and to go on producing the World's safest aeroplanes.

At one time or another this paper has waged bitter wars with Government departments. But its attacks have always been directed against the misapplication of, or over-insistence on, Government regulations which in themselves were desirable.

THE CRUX OF THE ARGUMENT.

That very point seemed to be the chief issue of the discussion on Mr. Howard's Paper. The general opinion seemed rather to be that, as this paper has so often pointed out, the British Airworthiness Certificate is recognised all over the World as the hall-mark of a trustworthy aeroplane, and that we should be unwise to remove our hall-mark, so to speak. On the other hand, much was said to show that the regulations under which a Certificate of Airworthiness is granted may be, and often are, enforced too rigidly.

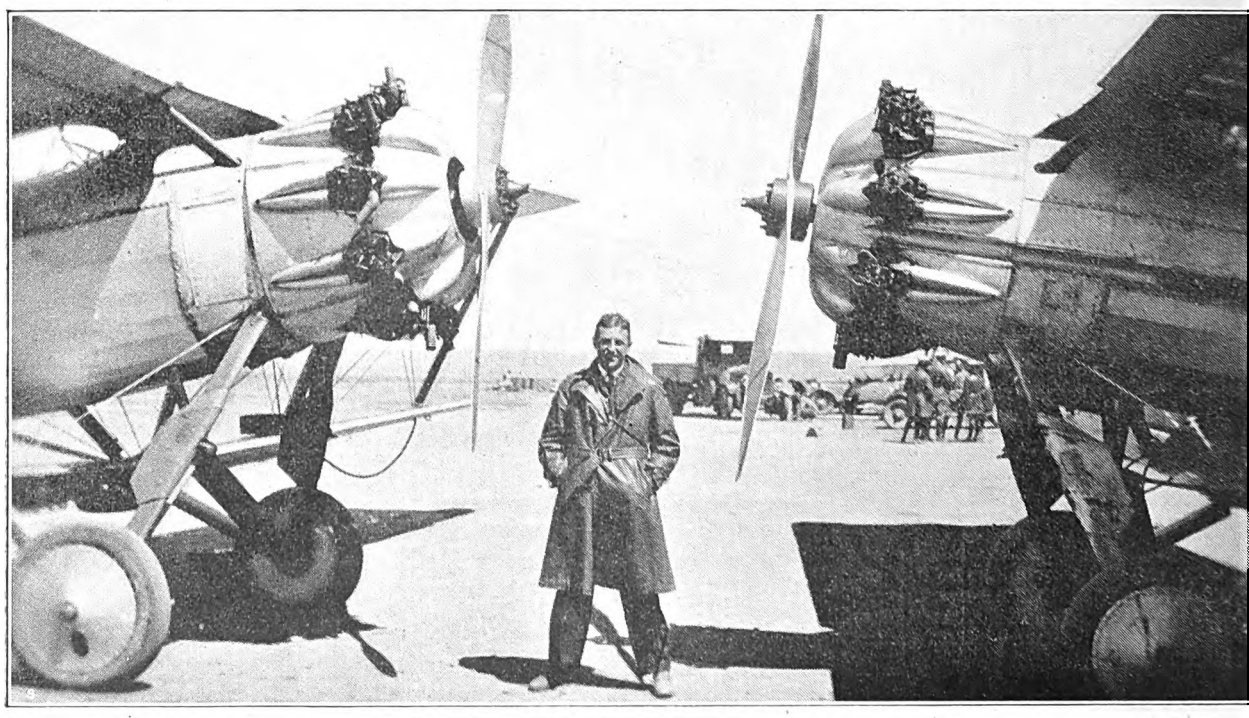
In fact one came away from the meeting convinced that the proper thing for us to do, as a commercial nation with an international reputation for hypocrisy, would be to raise our standard of airworthiness to such a degree that no foreign nation could hope to compete with it, and then abolish it.

One very interesting suggestion made in the discussion was that aircraft intended for use as public transport vehicles should be subjected to inspection and approval of design, construction, and flying qualities, much as motor-'buses are inspected by Scotland Yard, and that aircraft intended for private use should be free of all restrictions just as motor cars are. Even that much regulation would lead to agitation against restrictive rules. One remembers how fiercely makers of motor-'buses and taxi-cabs fought against the regulations imposed by Scotland Yard, and how the late Inspector Bassom administered those regulations with all the wisdom and humour of King Solomon.

But there is a good deal to be said for this argument, although there are obvious difficulties in the way. For example, aircraft of the same kind may be used for both purposes. The multi-engined 6-seater limousine may be the property of a wealthy private owner or it may be used as an air-liner. And even 2-seater light aeroplanes, of the types which are most popular of all among private owners, are quite commonly used as air-taxies or for joy-riding.

Firms making those craft could not very well differentiate between those which were intended for one use and those for the other. Even if they did, when once the organisation for Government inspection and approval had been set up in their factories, the difference between the cost of inspecting one machine and not inspecting another would make no difference to the selling price. And so the firm might just as well have their private machines inspected and use their Government certification as a selling-point.

Probably when the question was put to the test the majority of private owners buying first-class aeroplanes would rather pay the extra few pounds for a Certificate of



BRITISH ENTERPRISE.—Mr. Geoffrey Clapham, Instructor to the Bolivian Army, and two Vickers Vespas (Jupiters) on the 13,000 foot aerodrome at La Paz.

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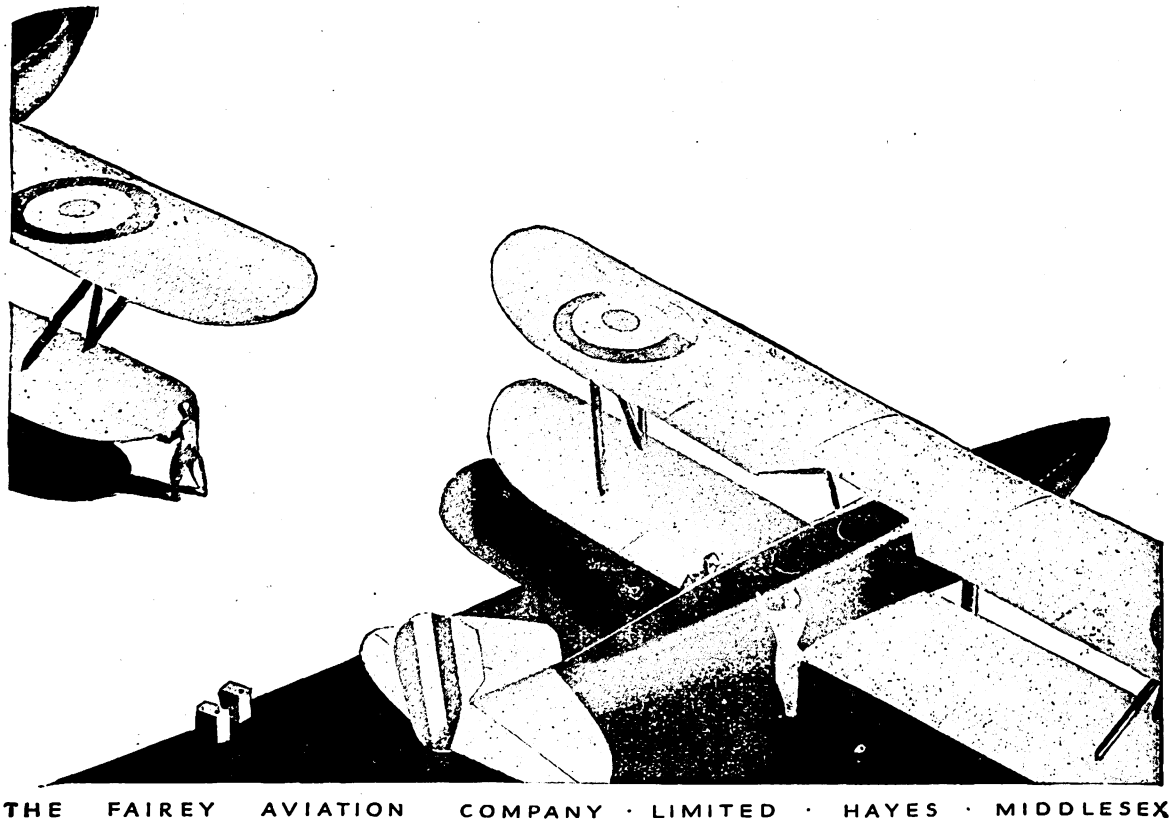
Fairey
AIRCRAFT



THE FAIREY AVIATION COMPANY · LIMITED · HAYES · MIDDLESEX

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Government Inspection. And there is no doubt that the insurance people would ask a lower premium on a machine with a Government Certificate.

EXTREMES THAT DID NOT MEET.

The two extremes in the discussion were represented by Major Barlow of the Fairey Company and Mr. Walker of the De Havilland Company. Major Barlow held that our aircraft lost prestige abroad because we did not insist on our standard of airworthiness being adopted by the whole World, in the same way that our Victorian standard for shipping had been forced upon the World. He held that it was still not too late for us to refuse to sign agreements to accept other people's limits. And he argued, very rightly too, that internationalism could be pushed too far.

One sympathises very much with Major Barlow's outlook. There is a fine smack about it of the Victorian days when Palmerston was in power and England was England and everybody else was a damned foreigner.

Personally one often feels like that. But on the whole it is not good for foreign trade. After all, we want to do business with foreign nations. There have been times when one has ventured to be mildly critical about some of our Continental friends, and always one has been told quite frankly by members of the Trade that such criticism was apt to upset foreign buyers and spoil our market. So by adopting a superior manner all round we might make ourselves still more unpopular.

Nevertheless Major Barlow was perfectly right in his belief that we must keep up, in such things as matter most in our aircraft, a standard of airworthiness which other people do not attain.

APPARENT INFERIORITY.

The unfortunate fact about this seems to be that because of the way in which we calculate our figures, we seem on paper to have a lower factor of safety in our machines than other nations have, whereas really we have a higher factor.

So far as one could gather from the more technical portions of the discussion, when we want to calculate the strength of our spars or fuselages we take as the basis of calculation the maximum load which can conceivably be put on those parts, and then we add a third to it, and then we insist on the strength being up to standing a strain of seven times that amount. And we call that a factor of safety of seven to one.

Other nations start off by taking as their basis the maximum load which can conceivably be put on that particular part, and then, without adding the extra one-third for luck, they insist on let us say a factor of safety of nine to one.

To put it into purely imaginary figures, supposing there is a certain part which *might* be subjected to a load of say 3,000 lbs., we add one-third to that and assume that it may be subjected to a load of 4,000 lbs. Then we inflict a factor of safety of seven to one, and insist that that part shall be able to stand a stress of 28,000 lbs.

Another nation calculating the stresses on the same part takes the greatest possible load as 3,000 lbs., insists on a factor of safety of nine to one, and the result is that the part is only made to stand up to a stress of 27,000 lbs. Consequently, although the foreigner says that his machine has a factor of safety of nine to one in that particular part, the part is actually weaker than the same part in a British machine which we say only has a factor of safety of seven to one.

Further complication comes in because we calculate our stress for what is called the yield-point, that is the force needed to cause that particular part to deflect beyond a certain amount. Continental nations calculate theirs for the breaking point. And obviously less force is needed to reach the yield-point than to reach the breaking point.

Over and above that, we are rather apt to over-estimate the force which may conceivably be put on a certain part, whereas other nations are apt to under-estimate the forces.

The result of it all is that our machines come out a great deal stronger than those of foreign nations, although on paper they appear to have a lower factor of safety.

THE CONSERVATIVE REVOLUTIONARY.

At the opposite extreme to Major Barlow was Mr. C. C. Walker, the Technical Director of the De Havilland Company. If ever there was a thoroughly sound conservative engineer it is Mr. Walker, but on the subject of Airworthiness Certificates he seems to be a perfect Bolshevik. According to him the Aircraft Industry has become so used to having everything inspected during the War that to get the question of inspection into the proper perspective it ought to have a look at some other industry, for example, the car business.

He pointed out how pleased a car owner would be if he had to take his car to a Government Department to be certified as road-worthy every twelve months, and how encouraging it would be if every time anything was altered in the design or equipment of a car, such as the speedometer or the oil gauge, the whole car had to be re-certified as road-worthy.

He said that if everything about a car had to be certified in the way that it has to be in an aeroplane the general effect would be to guard against the buyer thinking that he had a good car, and any firm's 1928 model would be lucky if it got onto the market in 1931.

He said quite frankly that the manufacture of aircraft under the existing mass of regulations was only possible because of the good will of the Air Ministry. If the regulations were strictly interpreted, we should find ourselves in such a position that every aeroplane moving from one part of the country to the other, let alone to other parts of the World, could only be certified as airworthy if there were somebody on the spot to inspect it within five minutes of each flight.

Here Mr. Walker is obviously right. A machine which would pass the get-off and climb tests quite easily at Martlesham simply could not look at the same tests on an aerodrome in Tanganyika or Queensland,—as has been pointed out in this paper several times.

Mr. Walker made the very sensible suggestion that the get-off and climb tests should be abolished altogether as tests, and the results should merely be stated as performance figures on the machine's certificate. Then the buyer could please himself whether he thought that they were

PERFORMANCE.—The Gloster Survey (two geared upiters), the World's fastest twin-engined commercial aeroplane,—141 m.p.hr., with a landing speed of 45 m.p.hr.

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good enough or not for the circumstances under which he intended to use the machine.

APPROVED FIRMS.

The person who poured the most oil on the troubled waters was certainly Air Commodore F. V. Holt, the Director of Technical Development at the Air Ministry. He expressed his opinion that for our remarkable freedom from accident we had to thank largely the competence of the Certification Branch of the Air Ministry. He added that the Air Member for Supply and Research on the Air Council, Air Marshal Sir John Higgins, recognised the high quality now attained by British manufacturers, and had decided that the Air Ministry could now afford to relax considerably the rigours of inspection, at any rate so far as approved firms were concerned, and that such firms in future would have few difficulties in having their machines passed.

This brings up a question which must affect quite largely the whole business of exporting aircraft in the future. What precisely is an approved firm?

In the ordinary way an approved firm is allowed to have a resident A.I.D. Inspector who, as one prominent member of the Trade said the other night, is an inspector of morals rather than an inspector of materials. That is to say, instead of inspecting every little bit and piece of every machine that goes through he judges whether the firm itself and the firm's own inspectors can be trusted to turn out good work. And if he esteems them as trustworthy he leaves them alone so that the firm can get the maximum output with the minimum interference by inspection.

That is all very fine where the big well-established firms are concerned. So far as one knows every firm at present established in the Aircraft Industry is an approved firm. But this differentiation between approved firms and non-approved firms is going to make things very difficult for new firms coming into the Trade.

There is very good reason for limiting orders for war machines to a certain number of approved firms whose morals, manners, and methods are intimately known to the Air Ministry, and on whose ability to produce aircraft of the right quality and in required quantity the Air Ministry can rely. But civil aircraft are another matter.

INCREASING EXPORTS.

What this country needs more than anything else is to increase its exports. And, because competition is good for trade, the more firms there are building civil aircraft for export the better for everybody concerned.

If nobody had any motor cars nobody would want any motor cars. If one firm started trying to sell cars in a country where there were none, it would have much difficulty in persuading anybody to buy one. But if a dozen firms all started trying to sell cars in that country at once, the inhabitants would begin to think that cars were worth having. By the time every car maker had criticised every other car maker's products in detail, some of the inhabitants would have learned so much that they would have become motor experts. And in the end there would be a boom in motoring in that country.

In much the same way, the more people there are trying to sell aeroplanes in any given country, the more aeroplanes will be sold. Therefore everything possible should be done by the Air Ministry to make easy the production of new types of aircraft, so that they can be sold abroad.

JAMMING PROGRESS.

Now if, as seems more than likely, there is a flood of new types of aircraft, all wanting Airworthiness Certificates at once, in the early part of this year, there is going to be such a rush of work in the Stress Department and the other Inspection Departments of the Air Ministry that progress will be jammed. And later when the design and construction of these new types have been approved, when they are all sent to Martlesham or Felixstowe (for flying-boats) to be flight-tested, there will be a jam of work there too.

Obviously if there happens to be such a rush of work on civil machines and just about the same time an Air Ministry Design Competition for war machines happens to come along, work on the civil machines will have to be shelved for the benefit of the Service machines.

Looking at the matter purely as affecting the general prosperity of the country, the civil machines ought to have precedence over the war machines because at the moment the export trade of the country is of more immediate importance than is the provision of new types of aircraft five years hence for the R.A.F.

The point here is that stress calculations and other preliminary inspection of Service machines cannot produce any effect on our export trade for five or six years. After the designs of war machines have been approved, the designs have to be judged by the Air Ministry and selected for production. Then machines have to be built to the chosen designs. Then they have to be type-tested. And then they have to have their own little private competition in the air.

When the winning types have been selected for the R.A.F., the machines have to be put into production. And after that they cannot be sold to foreign nations until several squadrons of the R.A.F. have been equipped with them.

All that means a gap of four or five years between the submitting of the original designs to the Air Ministry and the possibility of exporting those machines to foreign Powers. On the other hand, a civil machine the design of which has been submitted for approval to the Airworthiness Department to-day, might very well pass all its tests and be in production and exported overseas six months hence. And then it would be an actual source of income to the country.

Under our normal system of stress calculating and inspecting and so forth, with Service machines all mixed up with civil machines, the production of a new machine may be hung up for a year or more.

A POSSIBLE DANGER..

One result of any such hang-up is bound to be a feeling among new firms that official work on their machines is being side-tracked so as to give preference to older firms. Many of the people who are coming into the Aircraft Industry with a lot of money behind them are not used to the complicated system of inspection which exists at the Air Ministry, although some of them have produced a good deal of war material in their time.

The Air Ministry ought to be particularly careful to guard against any impression of this sort getting about. One mentions this particularly because already one has heard from a newcomer a story that an official in a certain Government Department had said that neither he nor any of these new people were going to get the certificates for new makes of machines in a hurry, and that they would be lucky if they got anything through this Summer.

WHAT IS NEEDED.

Obviously what is most needed is an entirely separate establishment to judge the airworthiness of civil machines, quite apart from that which has the stressing, inspecting, and testing of Service machines

The principle of subjecting civil machines to the judgment of Service officers is in itself wrong. The Admiralty has nothing to do with judging the seaworthiness of ships, other than subsidised auxiliary cruisers. And the War Office does not certify motor vehicles other than subsidised motor lorries. So why should the Department of the Air Member for Supply and Research have anything to do with civil aircraft?

There is no hope of the Treasury sanctioning the formation of an establishment to test and certify civil aircraft. But one does venture to suggest to the Air Ministry that existing departments might be divided off so that certain people have to deal with civil machines, and are only called upon to deal with Service machines if they happen to be short of work in their own department.

Furthermore, one agrees with Capt. Harold Balfour that flying tests should be done by the firms' own pilots. Admittedly those pilots who have been specially selected and trained as test pilots at Martlesham and Felixstowe do know their jobs thoroughly and well, and in a way it is all to their good as test pilots that they should have experience of the latest civil machines so that they have a chance of comparing their flying qualities with those of Service machines. Very probably in the future they will find civil aircraft specially designed for high efficiency quite educative after flying Service machines with full war equipment stuck all over them. But that is not enough reason for delaying the tests of civil machines, if the pilots happen to be busy testing war machines.

Purely from the point of view of Civil Aviation, the great thing is to get civil aircraft through all their tests as quickly as possible, so that they can be offered to the overseas markets and bring money into the country. So long as those machines put up certain performance figures, which can be checked by official measuring instruments while the machines are being flown by their own pilots, there is no reason at all why they should be submitted to the opinions of Service pilots unless their makers particularly want such opinions for their own guidance.

Now more than ever, time is the essence of the contract. We want our civil machines out on the World's markets as quickly as we can get them there, so that they shall not be forestalled by cheaply-produced aircraft, or by aircraft which are being dumped at less than production cost.

Any buyer in the World will pay more for a British aeroplane than for an aeroplane made in any other country, given equal performance and accommodation. But he must have the machine when he wants it. And obviously one of the chief functions of the Air Ministry, so long as it is allowed to control Civil Aviation, is to get our aircraft out and all over the World as quickly as may be. If it shows any sign of hampering output it will only be lending weight to the arguments of those who hold that certifying for airworthiness should be a function of the Board of Trade and that the regulation of air traffic should be a function of the Ministry of Transport.—C. G. G.

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CERTIFICATES OF AIRWORTHINESS.

On January 23 Mr. H. B. Howard, of the Airworthiness Department, Air Ministry, read his paper on "Certificates of Airworthiness" before the Royal Aeronautical Society. At the opening of his paper he explains that his object is to show the effect of Airworthiness Regulations on the design of civil aircraft. As the Air Navigation Regulations became effective on May 1, 1919, the whole development of post-war Civil Aviation has been under Government supervision

The pilot, navigator and ground engineer of a passenger-carrying aircraft, as well as the aerodromes used by it, must all be licensed. The instruments and equipment must be of approved types. The aircraft itself must have a Certificate of Airworthiness (commonly known as a C. of A.) which has to be renewed every year.

Mr. Howard points out that our view of what constitutes a safe aircraft is continually changing, and many of the types which have made aeronautical history could not have got a certificate of airworthiness. Regulations, however, can only crystallise informed opinion concerning minimum standards.

A legal meaning is given to "airworthiness" by means of rules which are almost entirely empirical. Although these safety precautions might be supposed to have no influence over design, actually some of the most vital safety conditions are fundamental in the lay-out of the design.

The design features of an aircraft can be broadly divided into two groups. First are the attributes, such as stability and controllability, which can be corrected by a process of trial and error. Second are the qualities which are fundamental in the design, principally structural strength. There are also power-loading and surface-loading which affect a safe take-off and the system of load distribution which affects the position of the Centre of Gravity.

The legal provisions must be drafted to represent the best current practice in airworthiness. The Law should only impose those restrictions which the experienced designer would impose upon himself.

The take-off requirements for civil aircraft are that the machine shall clear a barrier 20 metres (65.6 ft.) high in a certain stated distance, starting from rest, against a wind of not more than 8 km.p.h. (5 m.p.h.), and in addition shall climb to a stated height in three minutes.

According to our regulations public passenger-carriers must clear 20 m. in 500 m. (1,640 ft.) and climb to 420 m. (1,380 ft.) in three minutes. Special category aircraft are allowed 750 m. (2,460 ft.) to clear the barrier, and need only climb to 360 m. (1,180 ft.) in three minutes. Other aircraft are allowed 600 m. (1,970 ft.) to clear the barrier, and also have to climb to 360 m. (1,180 ft.) in three minutes.

These standards are identical with those agreed internationally as minima except for the passenger-carrying class. We have reduced the distance in the barrier test from 600 m. to 500 m. and increased the rate of climb from 360 to 420 m. in three minutes.

The two conditions are not intended to be consistent. The climb to height usually limits the weight of the lightly loaded, lower-speed aircraft, and the barrier test that of the higher speed more heavily-loaded types. Whether these conditions secure the same measure of safety on all types is open to question.

In three minutes a high-speed passenger-carrier, even at climbing speed, will have travelled a considerable distance. In a country of uneven contour a better stipulation might be that a safe height had been reached in a certain distance.

Take-off is largely determined by available aerodromes and the nature of the country over which flying will be done. As these conditions are not regulated by the certificate, take-off requirements have to be adjusted to normal conditions. This may handicap the development of specialised aircraft.

Mr. Howard asks the question: "Exactly what strength should this aircraft have?" and says the candid answer is: "Nobody knows." However, we know enough to make aircraft safe even if we do not know how safe we have made them.

Considering structural strength, aircraft may be divided into two classes, acrobatic and normal. The loads encountered by the acrobatic class are fairly well known. Our system of load factors is largely built up on this kind of evidence obtained from accelerometer measurements.

The designer of this class can only provide the strength which past experience indicates as required. The responsibility for not placing greater stresses on the machine then rests with the pilot. The human element is the obstacle to an exact solution, because different pilots will produce differing loads upon the structure.

The position in the normal category is different, because no acrobatics are allowed, and therefore different pilots should not produce greatly differing loads in the structure. There is however a complete absence of satisfactory data. For the normal category the load factors used are about two-thirds of their value for the acrobatic class.

As British air transport services have covered some 8,000,000 machine-miles without a single accident attributed to structural failure aircraft may be assumed to be either just right or too strong. There seems some reason to hope that the latter may be the case and that the factors might be reduced.

Before such reductions can be made information is needed concerning air speed and accelerations. For example, if records were available to show that a certain type, over a large number of flying hours, never exceeded its top speed by more than ten per cent., never encountered an upward acceleration of more than 2G (that is, twice the force of gravity), nor a downward acceleration of more than $-\frac{1}{2}$G, such information would form an invaluable basis for fixing its load factors.

Mr. Howard only quotes these figures as illustrations, but is of the opinion that they would be found substantially correct for the large multi-engined passenger-carriers. On such a basis, maxima could be fixed for wing-loads, tail-loads, and the like. The scheme of strength specification would then be built up on a far sounder basis than at present.

Mr. Howard next deals with accidents and says that their occurrence is the acid test for any system of airworthiness. He then quotes the last official Annual Report on the Progress of Civil Aviation (1928) and analyses the accidents.

The first broad sub-division is between accidents caused by an error of judgment on the part of the pilot and those due to other causes. From figures which extend back to April 1, 1923, the pilot's error of judgment has been responsible for roughly 60 per cent. of the total number of accidents.

As the verdict "error of judgment" should be regarded as a criticism of aircraft in general rather than of an individual, Mr. Howard prepared another table. This he divides into six classes:—

First, *Stalling near the ground,* which was responsible for 28 per cent. of the total.

Second, *Collision,* either in the air or on the ground, which accounts for 23 per cent.

Third, *Engine Failure,* with nearly 18 per cent.

Fourth, *Miscellaneous,* which includes weather and all causes not affected by the airworthiness of the machine—this covers nearly 16 per cent.

Fifth, *Failure to recover from acrobatics,* the figure for this is about 8½ per cent.

Sixth, *Structural Failure,* responsible for 5½ per cent.

Mr. Howard comments on the various causes as follows:—

Stalling near the ground.—Researches into low speed control are probably too recent to have affected these figures, but there is no reasonable doubt that accidents under this head will be greatly reduced in number and consequential damage.

Collision.—These though numerically a very large proportion are often not seriously injurious to personnel. They are usually blamed on the pilot, and emphasise the need for a good field of view is a safety measure.

Engine failure and *Miscellaneous* do not concern us.

Failure to recover from acrobatics.—This class includes spins continued into the ground, and loops made too low.

Structural Failure.—Any serious structural defect in design results in a crop of accidents of the same type. No such tendency is observed here. Two were fatigue failures of fittings. One was the failure of a float-chassis of a Schneider Cup Racer. The fourth was due to the fraying of an aileron cable and was therefore partly a maintenance question. The fifth was due to the breaking of a safety-bolt and the last was the failure of a wing-structure during acrobatics. This last was the only recorded accident of this class to a type which has been very widely flown in this country.

The I.C.A.N. is now engaged in unifying the minimum technical requirements in all countries signatory to the Air Convention. The process of adjustment of our ideas of safety to our state of knowledge renders this attractive idea never-ending. There are moreover racial differences which remain ineradicable.

One group of nations prefers to test its type of aircraft to destruction; another, to which we belong, is prepared to rely on calculations. To bring two such systems into line so that they have the same result in operation is a practical impossibility. A considerable likelihood will remain that an aircraft which passes by one system will fail by the other.

This type of difficulty is enhanced by the rapid and independent development of aircraft design in different countries during the War 1914-18, when each country developed its own design, technique, and tradition.

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AWAITING DELIVERY.—Six Saunders-Roe-built Blackburn Bluebirds (Cirrus III engines) on Cowes aerodrome before being delivered by air to National Flying Services. —(*"Aeroplane" photograph.*)

Had civil aviation evolved naturally with a free exchange of ideas, the problem of internationalisation might have been simpler. This war inheritance is very evident both in our aircraft and our regulations

There are deeper differences which need to be rcconciled, differences in methods of use, and maintenance. There are differences in the materials used, the methods of their manufacture, inspection, and maintenance. Similar differences arise in the take-off performance.

Mr. Howard says that although the only international requirement may be argued to be a minimum regulation, yet his own feeling is that internationalisation, though indispensable for some purposes, can easily be pushed too far in others.

He closes his paper by saying that he has only attempted to outline a few aspects of a very broad question.

The Discussion.

COL. THE MASTER OF SEMPILL said that those present, whatever were their views, would agree that Mr. Howard and his department were dealing very intelligently with a difficult matter. He pointed out that when the Air Navigation Acts of 1911 and 1913 were passed there were no airworthiness regulations, and, in spite of that the early safety was remarkable. The Committee of which Lord Northcliffe was chairman in 1918 was the first to suggest airworthiness regulations. Japan was the first country to suggest International Regulations. He mentioned that Germany and the United States are still non-contracting parties to the I.C.A.N., and until 1928 there were no air regulations in the States, other than in individual States. He asked whether Sir Sefton Brancker could tell the Society what were the requirements for the American Certificate of Airworthiness. Also he asked whether the present British standard for civil aircraft was not too high.

SIR SEFTON BRANCKER said it was the irony of fate that he, who had always objected to regulations, should now be in the position of enforcing them. He told the story against himself of how once at Lympne he went up in a new type of aircraft and was told later by a colleague in the Air Ministry that he had broken four laws in five minutes by flying (a) in an unregistered aircraft (b) which was not certified as airworthy, (c) and had no aerobatic certificate and (d) was being stunted over a public aerodrome. He said that any tendency to play too much for safety must be avoided.

Referring to the lack of regulations in 1911 and 1913 he could only compare the state of affairs over here then with that obtaining now in the United States where even in the year following the adoption of regulations, about 129 pilots and 230 passengers were killed.

The International Convention could not agree on the minimum figures for public safety, but the technical experts now visited one another's countries and agreed that their machines were just about as good as one another. He thought the most practical arrangement was the reciprocal agreements to recognise Certificates of Airworthiness now in existence between this country and Germany, this country and the United States, and this country and Holland.

There were two people from this country in the United States now studying conditions over there and from them he gathered that the conditions required for the U.S. Export licence, which was an extra to the ordinary permission to fly, just about put American craft on a line with ours.

There was some difficulty in obtaining a minimum requirement, obviously a machine which was airworthy for a large level aerodrome at sea-level would not be airworthy for a confined field in Tanganyika. He thought that the question of airworthiness must be taken up by the operating companies and the Insurance people. He referred to the fact that the British Airworthiness Certificate was now being used to push sales, an object for which it was never intended.

MR. HANDLEY PAGE asked whether we needed any airworthiness certificate for civil aircraft. The present state of affairs had grown out of war conditions when the Government, as chief or sole buyer, could dictate the conditions of manufacture. From approving nuts and bolts the system had grown until it approved the completed aircraft.

He questioned whether the present state of affairs would have been reached had the Aircraft Industry grown like the car industry. There was not a vast difference between the two. The motor travelled along a highway provided at public expense whereas the aeroplane travelled in the air above individually owned property. As the individual

BEFORE DELIVERY.—A photograph taken at Cowes before the delivery of the first six Blackburn Bluebirds, built by Saunders-Roe Ltd., to N.F.S. From left to right: Messrs. Stack, Egglesfield, Findlay, Schofield, Pennington and Styran, N.F.S. pilots; Mr. G. E. F. Boyes, Asst. General Manager of N.F.S.; Messrs. John Lord and W. E. Broadsmith, of Saunders-Roe Ltd., and Sq. Ldr. C. A. Ridley, of Auto-Auctions Ltd., the sole agents for the Bluebird. —(*"Aeroplane" photograph.*)

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allowed the air over his property to be used he had to be protected, as did the man in the machine.

The real interest in providing this protection lay with the manufacturer, the man who flies, and the operating firms. The first could not sell his machines if they were not safe, the second would not buy, and the third would not find passengers. The decision as to safety requirements should rest with these.

The recent growth of private flying had given a much wider experience to manufacturers and operators than could be got in a Government department. Mr. Handley Page explained that he was expressing a personal opinion and not that of any body like the S.B.A.C.

In a large machine the strength of the fuselage was largely determined by the nose-diving conditions at terminal speed, whereas in fact with the control surfaces used no pilot was able to put a machine in such a position. A machine designed according to these conditions was therefore too heavy. Because of improved methods of control at or below stalling point a smaller rudder could be used. This would save weight.

He said that the paper clearly brought out the lack of satisfactory data for loads met by large machines in the air. Mr. Howard also showed upon what empirical data the factors for commercial craft were based—2/3 of those required for acrobatics.

Talking about the I.C.A.N. requirements, Mr. Handley Page said that the British Airworthiness Regulations required flying wires to be 15 per cent. stronger than the minimum (I.C.A.N.) loads, whereas on the Continent the wires were only just up to this minimum load. Technically speaking the sand-load test and the calculated breaking load should have the same result.

The ultimate test was whether the aircraft was safe to fly and whether the operating company were satisfied. People preferred British ships, and he hoped that in the future they would prefer British Aircraft. We wanted less regulation and more flexibility. Regulations had a far-reaching effect and interfered with mass-production. They resulted in a serious increase in cost.

MAJOR MAYO, who is technical adviser to Imperial Airways Ltd., said that Mr. Howard and his Airworthiness Department might be justly proud of the important part they had played in bringing about the present high standard of British Aviation. He did not agree that Airworthiness Certificates should be abolished. New constructors might arise who were outside the august Ring and who were without the wide experience of the older firms. He would have thought the S.B.A.C. would have welcomed a definite standard as safeguarding the Industry.

He paid a tribute to the A.I.D. and said that the whole question of the regulations was one of interpretation. Referring to the recent activity of Lloyd's and the British Corporation in taking up the registration of aircraft, he said that the group with which he was connected, the British Corporation, had no desire to encroach upon the work of the Airworthiness Department, which must retain its place. They did however hope to do useful work in inspection and survey, based on A.I.D. lines.

An investigation was now being made into the question of loads during flight and the results of these should be available for the Airworthiness Department in three months. A difficulty arose if a machine which was sufficiently strong for the Continent went further afield to Africa or the tropics where climatic conditions were so different and the air currents caused greater accelerations.

Operating companies found that the durability of detail design was an important point though this was outside the scope of the Airworthiness Department. No one ever had trouble with the strength of the main structure, but they did have trouble with details. He thought that if it were found possible to reduce structure strengths, the weight saved should be used to increase the robustness of detail parts.

Referring to accidents he said that those due to stalling near the ground were likely to become less because of slots and similar devices. The accidents due to collision were a very large proportion of the total and were, he thought likely, to show an increase. He thought that the present standard of visibility was hopelessly inadequate, and that the Airworthiness Department ought to concentrate on this question. The question of agreement on an international certificate was important. If we set our own house in order there would not be much to worry about. We should set a standard that would be appreciated all over the world.

CAPTAIN DE HAVILLAND said that the application of the regulations was the chief difficulty. He disagreed from Major Mayo as he did not think these were generously interpreted. Firms would rather be free from Government interference. The settling of minimum regulations should be left to the firms. It was impossible under present conditions to compete in foreign markets. Regulations increased costs. The British Hall Mark was due to the excellence of our machines in spite of the Certificate of Airworthiness.

BUSINESS IS BUSINESS.—Mr. E. C. Brown, Aviation Manager to W. B. Dick and Co. Ltd., makers of Ilo lubricating oils, who uses a Coupé Gipsy-Moth for business journeys.—(*"Aeroplane" photograph.*)

MR. C. C. WALKER, Chief Engineer of the De Havilland Company, said that the Aircraft Industry had grown so used to the regulations that he thought that it was only by applying them to some similar industry like the Motor Trade that their full effect could be realised. How would the motor manufacturer fare if he had to submit a complete set of drawings to a Government department for approval and had to have every modification approved? Supposing this manufacturer had to get approval for every component he purchased, whether nuts and bolts or speedometers, supposing at the finish when the manufacturer had passed every test and got his machine approved, his customer got a certificate saying that provided he had "X" passengers each weighing 13 stone the vehicle might be driven in a straight line, but if the passengers exceeded 13 stone apiece the Government would not guarantee results.

The Government might circularise the manufacturer's client without informing the manufacturer and warn the customer that unless certain modifications were made his purchase would lose its certificate. None of which was calculated to increase the customer's confidence in the car. The regulations delayed production and increased cost. The money his firm had to spend on Certificate fees alone would keep 25 skilled men permanently employed.

Mr. Walker asked why approved firms should not be capable of making their own decisions? He thought that the cumbrous airworthiness machinery only worked because the good will of Air Commodore Holt and Sir Sefton Brancker saw that it did. What would happen when they went?

A safe load could never be specified, it depended entirely on particular conditions. The I.C.A.N. should not waste time on minimum safety regulations but devote themselves to their real business, such as navigation and seeing that aerodrome controls worked in the same sense.

Get-off and climb requirements should be eliminated from the regulations and merely quoted in the performance. The approved firm machinery in the regulations should be used to free constructors from interference.

AIR COMMODORE F. V. HOLT, Director of Technical Development at the Air Ministry, quoted Sir John Higgins as saying that the Airworthiness Department was responsible

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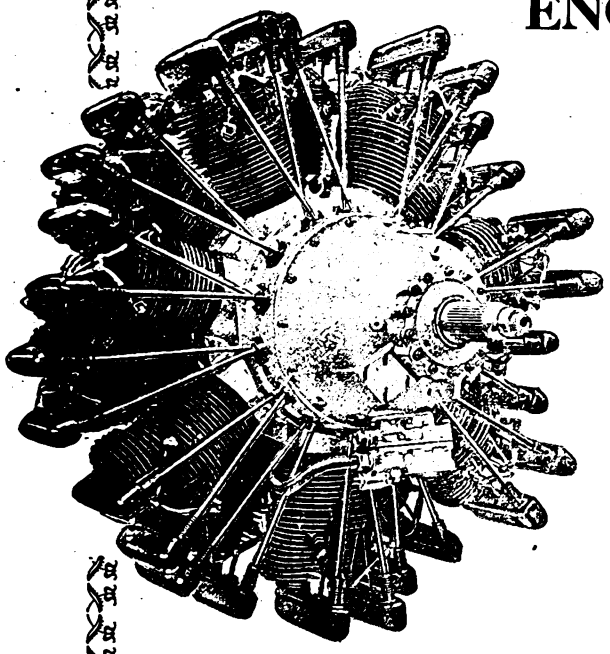
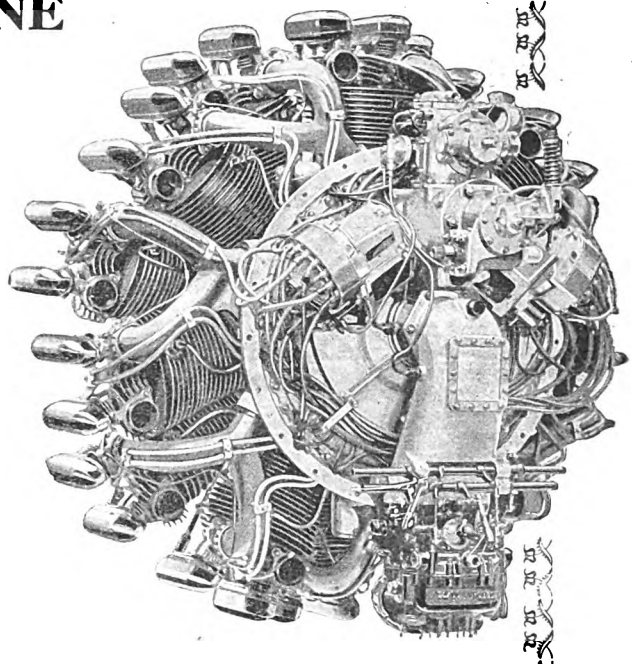
A New ARMSTRONG SIDDELEY ENGINE





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The power weight ratio of these two types is 1.65 lbs. (.75 Kg.) per h.p. for the geared fan and 1.92 lbs. (.87 Kg.) per h.p. for the supercharger, while the overall diameter is 46.75 in. (1.187 m).

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for the remarkable freedom from structural failures experienced by this country. He said he was not going to say much as he wished to listen to the discussion which would supply him with much useful material in his work of revising the regulations. He said that approved firms might expect a modified form of control. For the unapproved firms however he could hold out no hope.

DR. DOUGLAS, of the R.A.E., remarked on the tendency abroad to test to destruction, whereas we preferred to rely on calculation. He thought that it was good to do such tests occasionally, though there was some difficulty in checking up by tests on the materials afterwards. He outlined a scheme for measuring accelerations by means of a simple mechanism which would weigh very little.

MAJOR BARLOW, of the Fairey Aviation Co., said that the British aircraft lost prestige because we did not insist that our Airworthiness Certificate should be made the standard for the World in the same way as this country in the Victorian era made its shipping standards and enforced them over the world. This policy helped to expand the Empire and increase our trade. And it was still not too late for us to refuse to agree to work to other people's limits.

He asked what we meant by a safety factor. The I.C.A.N. worked on actual collapse whereas we used proof stress or yield-point. He said that when the Airworthiness Handbook published instructions for the wearing of a safety belt it was going too far. Why did this handbook contain metric measurements instead of British units? Internationalism could go too far.

MR. J. S. BUCHANAN, Assistant Director (Aircraft) in the Department of Supply and Research, said that Airworthiness Certificates were a matter of psychology. Ninety-nine per cent. of the British public thought that flying was dangerous, and they were probably right. He hoped that in time the insurance companies would achieve their own airworthiness department. At sea the Board of Trade fixed the minimum requirements for safety, and the insurance firm's prices graded the standard. He thought that manufacturers would probably find the insurance company more difficult to deal with than the Air Ministry, as they would want their 10 per cent. profit.

As our factor for aerobatic loading was 7½ and that required by the I.C.A.N. was 10, there was some difficulty in convincing the I.C.A.N. that our figures were adequate. Load factors were however only a small part of the work of the Airworthiness Department. There was also the inspection system, which was probably the best in the world.

Proper maintenance was specially important. Better to fly in a properly maintained machine with a low factor of safety than fly in a poorly maintained machine with a high factor of safety.

He said that every British aeroplane now being built in the United States has had to be stiffened up to comply with American stress requirements. He pointed out that every vehicle plying for public hire had to be licensed.

MR. RATCLIFFE said he understood that the safety factors were based on 1 1/3 times the loads normally encountered. He showed that the different methods of calculation and stressing employed here and in the United States accounted for the difference in safety factors. Here we calculate the whole load as being taken on the wings. In America the wings are only reckoned to take 80 per cent. And we worked out our figures on the yield-point, not on fracture.

He gathered from the paper read by the Hon. Wm. McCracken that the American manufacturers are not troubled with an A.I.D.

There were five features desirable in an aeroplane—Safety, Reliability, Speed, Low Cost, and Comfort. Airworthiness only applied to the first two. Doing stress-calculations for the Air Ministry held up other design work. And a Certificate of Airworthiness only covered main structures. As the present regulations stood an approved type of machine could be put in the air which would fall to pieces because of faulty detail design.

Civil aircraft should be divided into two classes—air liners and privately-owned machines. Air liners should have some guarantee of immunity from accident. Certificates of Airworthiness had little effect on potential owners of the small types. Unless that small type could show a record of immunity of accidents over a number of years, it would not be saleable. The cost of a C. of A. prevented young engineers from developing their ideas. The International certificate of airworthiness need apply to air liners only.

MR. M. L. BRAMSON said that the Certificate of Airworthiness could not guarantee airworthiness. Regulations were out of touch with actual conditions. In modern aircraft the field of vision was blanketted 15 deg. on each side of the centre line. Some of the modern cabin monoplanes built abroad were so aerodynamically efficient, with a flat gliding angle and high gliding speed, that they could not be landed in a normal space. The engine should have the same qualities imposed on it as the machine had.

CAPTAIN HAROLD BALFOUR said he had been goaded to speak by Major Mayo's and Mr. Buchanan's remarks. The present regulations were arbitrary and illogical. An *average* climb test was foolish. What constituted a good view? And why not certify the "wearability" of an aeroplane? The testing of commercial types at Martlesham or Felixstowe by Service pilots who had not got the commercial mind was wrong. The Department of Civil Aviation should either have its own pilots, or better, the firms' pilots should test machines under Air Ministry supervision. He asked whether the I.C.A.N. knew that Great Britain was the only country which fulfilled regulations. The others disregarded them and got the foreign trade.

MR. E. J. LYNAM, of the R.A.E., said that evidence of accelerations and air speeds would be valuable to the A.I.D. and the Stress Department. We were near the irreducible minimum in factors, though a reduction of factors might be possible for commercial craft. Any saving in weight should be used to make detail fittings more robust.

ANOTHER SPEAKER mentioned that American requirements for inverted flight were less severe than the British, and that stiffening up cut both ways. We insisted that American machines should be strengthened.

MR. HOWARD, replying, explained that collisions included hitting objects on the ground. The terminal-nose-dive conditions were an old thorn in the flesh and were now being reconsidered. He was glad to learn from Major Mayo that evidence was being collected about loads encountered in flight. Pilots' views on visibility were better than hard and fast rules. The Air Navigation Act was not invented by the Air Ministry, which simply existed to enforce the Act. If there were no Government control, the insurance companies might be worse. Tests to destruction made abroad were rough and ready and not so scientific as ours. The provision in the Airworthiness Handbook concerning the wearing and fitting of the safety belt was specially included as the result of a fatal accident. Our figures used to express safety factors were low because they were based on pessimistic estimates. He did not agree with Mr. Bramson that anything dangerous could get through the Airworthiness Regulations. The Martlesham pilots were conscientious and careful and very interested in commercial aircraft. Trials by Service pilots were very helpful.

[So ended what was one of the most momentous and interesting discussions ever held by the R.Ae.S. Let us hope it will have full effect on British Trade.—C. G. G.]

F.A.I. DECISIONS.

Lieut.-Colonel Mervyn O'Gorman, C.B., has presented to the Royal Aero Club his report of the meeting of the Committee of the *Fédération Aéronautique Internationale*, held in Paris on Jan. 17, 1930.

ANNUAL CONFERENCE.

It was decided that the Annual Conference of the F.A.I. should be held in Paris on June 10 to 15, 1930, at the invitation of the Minister for Air.

SCHNEIDER CONTEST, 1931.

The regulations for the 1931 Contest were considered and the recommendations of the Royal Aero Club were adopted.

The Committee decided to do away with the Watertightness and Navigability Tests, and substitute a "getting-off" and an "alighting" Test, to be done immediately prior to the Speed Contest, the whole taking place on one day.

The closing date of entries was fixed as July 31, 1930.

Clubs entering would be required to deposit with the Royal Aero Club a sum of 200,000 francs (French) per aircraft entered, as a guarantee of participation.

The Contest would take place between June 1 and September 30, 1931, and the exact date would be fixed three months prior to the date.

THE INTERNATIONAL TOURING COMPETITION, 1930.

The Regulations for the 1930 Competition, to be organised by the Aero Club of Germany, were drawn up. The date was fixed for July 20 to Aug. 7, 1930.

The following countries would take part:—Germany, Spain, France, England, Poland, Switzerland, and Czecho-Slovakia.

[From the absence of Italy one gathers that Italy has turned huffy over last year's contest, either because our competitors were not disqualified for alleged flying over Italian prohibited areas, or because the Italian machines did not win anything. Or perhaps Italy has decided that by then there will be a war with France for the possession of the Casino at Cannes.—ED.]

The start and finish would be at Berlin, and the circuit would be of approximately 7,500 kilometres, involving 28 obligatory stops at the following towns:—Brunswick, Frankfort, Reims, St. Inglevert, Bristol, London, Paris, Poitiers, Pau, Madrid, Seville, Barcelona, Nîmes, Lyon, Lausanne, Berne, Munich, Vienna, Prague, Breslau, Cracow, Warsaw, Koenigsberg or Dantzig.

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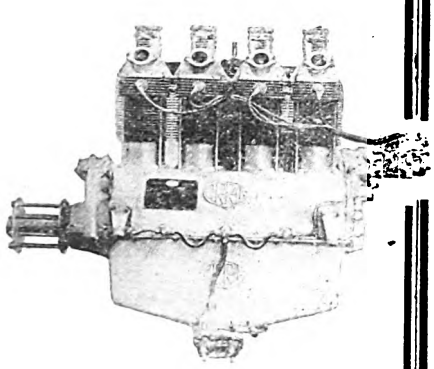
CIRRUS-BLUEBIRDS ARRIVING AT HANWORTH PARK ("Flight" photograph.)



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Extract from "Flight," 17th Jan.—Page 124.

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THE POSITION OF VETERANS.

The following letter from Capt. Harold Balfour, M.C., M.P., late R.F.C. and R.A.F., will be found of interest:—

Sir,—By means of a question in the House of Commons on Nov. 27, I drew attention to the fact that certain ranks of R.A.F. Officers engaged on active flying duties are paid less than Army Officers of corresponding rank and asked whether, in view of the risks of flying and the increased technical efficiency required, the Secretary of State for Air would consider a review of the basic rates of pay in respect of these ranks. I quoted in a supplementary question the example of a Major in the Army after five years in that rank drawing £1 17s. per diem and a Squadron Leader in the R.A.F. after five years in that rank and engaged on active flying duties drawing 1s. per diem less than his Army opposite.

The reply of the Under-Secretary of State for Air was to the effect that no revision was called for and that in making comparisons the whole career and opportunities for promotion in the Services should be considered.

The case I quoted must seem to the majority of people unjust and the reply I received must seem to infer that the risks in the R.A.F. are counter-balanced by better opportunities in the way of careers and promotion than are offered in the Army. This I must point out is not correct.

To any student of our newest and junior service it must be obvious that for certain fortunate grades promotion has been rapid and splendid careers are promised. There is meantime, however, a serious situation, growing up within the R.A.F., which can for a number of officers be likened to the position of those Naval officers of years past known as the "Hungry Hundred" of the Navy List.

To some 150 to 200 officers now in the R.A.F. holding permanent commissions and mostly of the rank of Flight Lieutenant, no career and no such prospects as implied in the reply of the Under-Secretary of State for Air are being offered. In many cases the original handicap to these officers began in 1916, when a rule was made that officers under 19 years of age should not proceed to France.

Prior to this, many gallant young men under 19 had proceeded overseas, filled tragic vacancies and obtained quick promotion. After this order the young men under 19 were held at home to instruct in flying and often saw their former pupils return home as Captains and Flight Commanders. As will be seen, this initial loss of seniority has proved fatal to prospects.

On the reorganisation of the peace-time R.A.F. in 1919, many young, though senior officers were placed high up in the Air Force List, and, as the largest demand for permanent commissions came from the Flight Lieutenant and Flying Officer ranks, consequently the more junior ones of these ranks at the time of the Armistice were placed very low on a long list.

Possibly such a handicap at this period was inevitable, but not only has this list never been revised nor are cases for promotion now considered on merits of service prior to its publication, but there has arisen a system which has the effect of further accentuating the disadvantageous position of this class of officer.

One of the first peace-time innovations was the institution of instructional courses in specialised subjects. At this period *esprit de corps* was low and discipline imperfect, so that naturally Commanding Officers were reluctant to lose their keenest and best young flying officers, allowing rather those who were not keen on flying duties, or whose absence was preferable to their presence, to proceed on these courses.

Similarly, some three to four years later the keenest officers volunteered for their tour of five years over-seas service, which, in many cases, once more meant active flying service whilst the less keen attended the courses at home. Shortly after this period, however, a new system for ruling destinies was introduced, whereby the completion of a specialised course is regarded as a necessity for advancement—those who have done so being given years *ante-date* towards promotion.

On return from overseas, and making belated application to be allowed now to do a course, the war-time pilot is told he is too old in his rank, and that only young, short-service or ex-Cranwell Cadet College officers are required.

Thus, however much these Flying Officers or Flight Lieutenants may have distinguished themselves, both during and since the war, they are left floundering in the back tide of promotion. War-time compatriots a few months their elders are on one side and post-war pupils from the Sandhurst of the Air are on the other side—both streams flowing rapidly ahead of them, and this through no fault of their own and, in fact, despite their best efforts.

These officers now find themselves Flight Lieutenants with years still in front of them in their present rank and a negligible chance of attaining to the highest ranks of the Service. They are bound to serve till forty years of age, unless willing to sacrifice pension rights by premature retirement, and at forty they will be too old to be considered for flying appointments in Civil Aviation or to start a new career.

I submit that it would be a welcome and wise solution if some scheme could be prepared which would allow those war-time officers who have filled the gap between war-time senior officers and the production of Cranwell College post-war officers to retire on a modified pension after 15 years of flying duty, and while still young enough to take up a Civil career.

Such a proposal would avoid in the future probable unemployment for retired officers to whom the Nation owes at least release on conditions which will give them some prospects for Civil life, if unable through the circumstances I have outlined to succeed in the Service to which they have devoted the best of their years.

I am, Sir,
Yours faithfully,
(Signed) HAROLD BALFOUR.

House of Commons, Jan. 20.

AVIATION IN INDIA.

In the House of Commons on Jan. 21 Major Pole asked the Secretary of State for India the number and locality of the landing grounds in India that could be used throughout the wet season; and what steps were being taken, or were proposed, to increase the number of landing grounds available all the year round.

Mr. Benn said that the following civil landing grounds were normally fit for use throughout wet seasons:—Karachi, Jodhpur, Delhi, Allahabad, Gaya and Dum Dum. In addition there were approximately 40 R.A.F. and Army Department landing grounds in various parts of India available for civil use under certain conditions, which were normally fit. The Government were working to a considered programme of progressive development of civil landing grounds on Indian routes as speedily as the funds available would permit.

In reply to another question by Major Pole, Mr. Benn said that the number of persons holding air pilot's licences in India was as follows:—"A" licences, 61; "B" licences, 25. The number of such licences issued during 1929 was: "A" licences, 56; "B" licences, 21.

THE BRITANNIA TROPHY.

The Britannia Trophy for the Year 1929 has been unanimously awarded by the Committee of the Royal Aero Club to the Hon. Lady Bailey, D.B.E., for her flight from England to South Africa and back, which was completed on Jan. 16, 1929.

THE ASHWELL-COOKE CHALLENGE CUP.

The First Competition for the Ashwell-Cooke Challenge Cup will be flown at Lympne, weather permitting, on Sunday next, Feb. 2, at 11.45 hrs. Competitors can have a "snack" lunch in the Club Room on the aerodrome.

Weather and time permitting, each competitor will have two attempts, one before and one after lunch. The Cinque Ports Club reminds competitors who are not members of this club, that by courtesy of the Air Ministry they will be charged only one landing fee at Lympne on the day of the Competition.

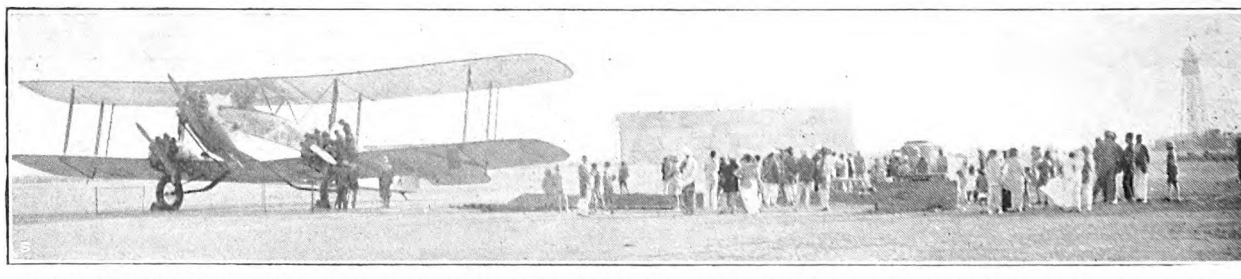
Flt. Lt. Fox-Barrett, of No. 25 (Fighter) Squadron, R.A.F., Hawkinge, has kindly consented to act as judge. Although entries will be received on the day of the event, it would help the officials if entry forms were sent in as soon as possible.

In the event of the Competition being cancelled by bad weather it will be automatically postponed until the following Sunday at the same time.

On Jan. 25 the ground engineer of the Cinque Ports Club, Mr. R. H. Wynne, was launched solo, and proceeded to demonstrate to the members how first solos should be flown. He made four model three-point landings in succession. As Mr. Wynne's instruction has necessarily been spasmodic and spread over a considerable period at odd intervals, his performance is very highly creditable. The Club hopes to see him take his "A" licence shortly.

DESSAU—SOUTH AMERICA.

On Jan. 24, two Bolivian army pilots left Dessau, Germany, in an attempt to reach South America. They are flying a Junkers W.33 monoplane of the *Bremen* type and will make the journey in stages. The first stop is to be Paris.



THE INDIAN AIR MAIL.—The first De Havilland Hercules (three Jupiters) getting ready to leave Karachi for Delhi on the new mail route to the Capital of All India. In the background may be seen the airship shed and the mooring mast, which have been ready for some time for the first airship voyage to India.

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COMMERCIAL AERONAUTICS.

INTRODUCING THE GLOSTER SURVEY.

On Jan. 25 the Aircraft Operating Co. Ltd. and the Gloster Aircraft Co. Ltd. gave a party at the Heston Air-Park to introduce officially the new Gloster Survey biplane, which was built last year to the specifications of the Aircraft Operating Company for special survey work.

This machine was shown at the Aero Show at Olympia in July. All who saw it recognised the exquisite workmanship which had been put into it and the all-round high-level of intelligence shown in the aerodynamic design and the detail design. When it appeared at Heston its performance proved clearly how all this work has been justified.

One can safely say that the machine has the finest performance of any twin-engined commercial aeroplane in the World. In the future other machines may beat it,—at any rate let us hope so for the good of aeronautical progress,—but to-day there does not seem to be any commercial aeroplane which has a top speed of over 140 miles an hour and an authentic landing speed of something like 45 m.p.h.

With its two geared Jupiter engines the Survey gets off the ground rather quicker than does the average single-seat fighter, and it seems to be just about as manœuvrable. Sitting in the cabin, when Mr. Saint, the Gloster chief pilot, opened up the engines, the back of the seat just hit one in the back and stayed put. One has driven, and has been driven in, a good many fast cars, but none of them has had anything like such acceleration.

In the air the machine obviously handles beautifully. Certainly we were not flying with full load, but there were six full-grown men on board, and a fair load of petrol. With that the machine climbed quite happily with one engine throttled right back, and the other airscrew merely turning round in the wind. On either side the machine turned easily against the pull of the engine, and flying flat it fish-tailed like a joy-ride Avro coming in to land.

Although the machine is not built as a passenger-carrier, but purely for survey work, there is heaps of room inside the fuselage for eight seats, and there is room in front for two or three people to stand up behind the two seats for the pilots, so this space might be used for passengers.

The Survey was designed for high performance, and undoubtedly it has got it. And such performance is necessary for the job for which it is intended. The idea behind it is that it shall have very great range and a high ceiling, so that a large area can be photographed while operating from one aerodrome.

The performance now makes possible the survey from the air of 30,000 square miles without having to shift camp, against a mere 400 square miles, which was all that could be covered with the single-engined machines with which the Aircraft Operating Company have hitherto been working. Thanks to this performance, the owners have been able to take on at an economic figure the contract for the air survey of 63,000 square miles of Northern Rhodesia, which is about equal to surveying the whole of England and Scotland from only two bases.

After the machine had been duly demonstrated, those concerned were entertained to lunch by the Gloster Co. and the Aircraft Operating Co. The guests of honour were:—The Lord Thomson of Cardington, P.C., C.B.E., D.S.O., Secretary of State for Air; Mr. F. Montague, M.P., Under-Secretary of State for Air; Sir Edward Crowe, K.C.M.G., O.B.E., Comptroller-General of the Department of Overseas Trade; Sir Cecil Bottomley, K.C.M.G., C.B., representing the Colonial Office; Air Vice-Marshal Sir Sefton Brancker, K.C.B., A.F.C., Director of Civil Aviation, and Colonel M. N. MacLeod, D.S.O., M.C., R.E., Chairman of the Air Survey Committee, War Office.

THE SPEECHES

MR. ALAN BUTLER, Chairman of the Aircraft Operating Co., proposing the health of Lord Thomson, said that this was an important moment in the birth of a new industry. His firm had been doing survey work for years, but they were turning the corner as they were now able to tender for the survey of vast tracts. The fact that the Secretary of State had paid them the honour of being the first passenger in the first aeroplane built expressly for survey work was an important compliment. It showed the Government's interest in this new industry.

Air surveyors were faced with complex problems. Courage was needed to build such a machine without definite contracts, and the Gloster Co. had built it for his firm on advantageous terms. Perhaps it was odd that he as a maker of aeroplanes himself should refer to the unreliability of aircraft, actually aircraft were as reliable as other means of transport, but over bush country a still greater degree of reliability was essential. Lord Thomson and Mr. Montague were giving a magnificent lead by flying everywhere themselves and proving their faith in the reliability of air transport.

BUSINESS AT HESTON.—Left to right: Mr. H. Hemming (Aircraft Operating Co. Ltd.); Mr. Montague (Under-Secretary for Air); Mr. Muntz, of Heston; Lord Thomson (Secretary of State for Air); Mr. Saint (Gloster Aircraft Co. Ltd.); and Mr. Alan Butler (Aircraft Operating Co. Ltd. and De Havilland Aircraft Co. Ltd. The aeronautical garb was worn because they were travelling in the open front.—(*"Aeroplane" photograph.*)

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The essential characteristics of an aircraft structure are strength, lightness, ease of inspection, repair and maintenance, and resistance to corrosion; all of which are incorporated in the production of the "Bristol" method of steel construction for aeroplanes. Excellence of design and the highest qualities of workmanship have been features of "Bristol" machines for more than twenty years, and the present day aircraft produced by the "Bristol" Company have added to the enviable reputation gained in the past. Experimental research work on built up high tensile steel strip structures is constantly employing the time of a highly skilled technical staff.

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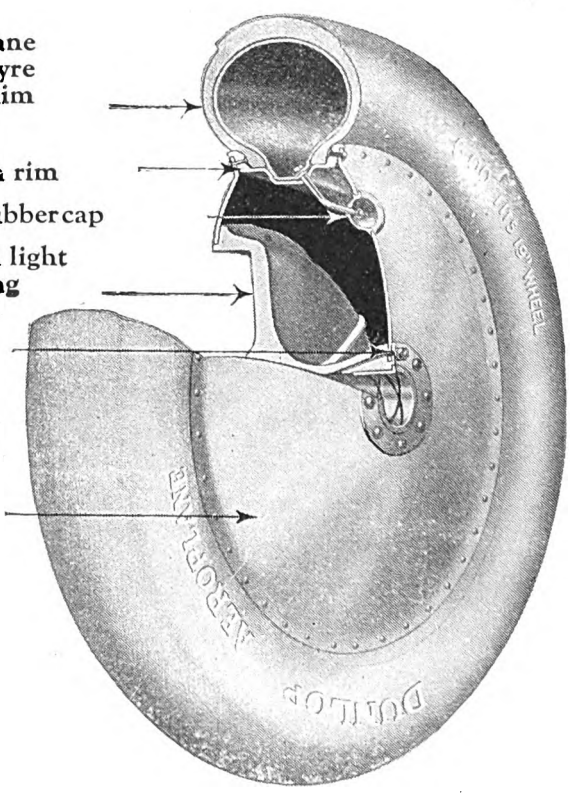

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

FULL-SIZED WIND TUNNELS.

On Thursday, Jan. 9, Mr. McKinnon Wood, who is one of the Chief Scientific Officers at the R.A.E., read a paper on "The New American Wind Tunnels" before the Royal Aeronautical Society. The feeling at this meeting and in the paper might well be expressed in the title of this report.

THE AEROPLANE, which its critics, both friendly and carping, are not generally prepared to accept as high-browed or scientific, has already dealt very fully with this subject. THE AEROPLANE for April 24, 1929, contained a full report of the 20 ft. Propeller Research Tunnel at Langley Field and this report was illustrated with pictures, drawings and diagrams. This tunnel was perhaps the most discussed ingredient of Mr. Wood's paper and here was THE AEROPLANE telling the World about it nine months ago!

That number, and an earlier one for Jan. 30, 1929, contained much useful information about the results obtained in this tunnel with streamlined cowling for air-cooled engines.

THE AEROPLANE is definitely in favour of the building of a full-size tunnel and the acceleration of research that must result therefrom.

If such proposed activity did materialise however, we should still be behind, because by the time that our tunnel is in full blast, the United States are likely to have a 70 ft. tunnel. In this, instead of only being able to test engines and fuselages and centre-sections, they will be able to test whole aircraft.

MR. WIMPERIS, who is the Director of Scientific Research at the Air Ministry and with whom Mr. Wood recently visited America, during this meeting said that he thought the reason the United States was spending so much money on aeronautical research was because the U.S. already built nine out of every ten cars in the world to-day, and they did not see why the same should not apply to aircraft. Readers of this paper will remember having come across something like this before.

MR. WOOD opened his lecture by explaining that much had been learnt from the use of model aircraft and from free flight in full-size machines. Such methods of research were however limited in many ways and captive methods persisted for preliminary tests.

The scope of this method was much increased by use of the principle that the reaction of the air upon an aircraft in steady straight flight depends only on the relative motion. This principle is used in a wind-tunnel where the air is moved steadily past a model. Such a tunnel was used by the Wrights in their early experiments.

The power required to produce the wind in the tunnel is many times that required to move the model in still air. Observation and measurement are much easier under these conditions. There is interest in noting, however, that naval architects as well as float-seaplane and flying-boat designers tow their models through still water.

There are two main types of tunnel. That developed by the N.P.L. where the model is tested in a stream flowing between closed walls and that developed by Eiffel where the model is tested in an experimental chamber across which the jet flows. Of the latter type is the 20 ft. Propeller Research Tunnel.

There are two features common to most tunnels. The airscrew fan for applying the power and the honeycomb for producing a steady flow. The micro-turbulence produced by the honeycomb is probably the cause of the divergent results obtained in different tunnels.

Mr. Wood says that the application of the principle of relative motion in its practical form, the wind tunnel, is to be accepted with caution, but that it is more safely accepted for tests on a large scale. The relation between any model test and a full scale aircraft may be expected to be the same if each has the same Reynolds number, i.e.,

$$\frac{\text{density} \times \text{linear scale} \times \text{speed}}{\text{viscosity}}, \text{ or as generally expressed } \frac{\rho l V}{\mu}$$

This law is not complied with in testing small-scale models in the usual form of tunnel because if a 1/10 scale model is used to represent the full-size machine moving at 68 m.p.h. (100 ft. sec.) the wind tunnel speed should be 1,000 ft. sec. The use of a compressed air tunnel gets over this difficulty.

The viscosity of air is not affected by pressure and so by increasing the density it is possible to increase the Reynolds number for a small model at slow speeds. To offset these advantages however is the increased power required to move the air and the stouter supports required to mount the model. The compromise usually effected is to use a fairly high pressure and reduce the wind-speed. If the pressure is 20 atmospheres and a 1/10 scale model is used the air-speed required in the tunnel is half that of the full size machine.

A compressed air tunnel which is slightly larger and considerably faster than the N.A.C.A. tunnel is being built in this country and will be erected at the N.P.L. This tunnel is of the open-jet kind with the return passage in an annular space close to the shell which encloses the whole apparatus and withstands the internal pressure. The pressure in the N.A.C.A. tunnel can be raised to 20 atmospheres in 1 hour 20 minutes. A series of tests made with three different types of wings showed conclusively that tests made in a compressed air tunnel agreed very closely with those obtained in free flight.

Mr. Wood then described the 20 ft. N.A.C.A. tunnel which was described in THE AEROPLANE for April 24. Mr. Wood criticises the design on the grounds that enough thought has not been devoted to the problem of getting machines in and out of the testing chamber. The reaction dynamometer is also difficult to instal.

Mr. Wood showed a slide of his proposed design. In this the return ducts from the collector trumpet-mouth instead of passing round both sides of the building are replaced by one duct on one side only. This arrangement makes it possible to have a large erecting space on one side of the airstream so that while one machine is on test another can be prepared. A transmission dynamometer is also necessary.

A small model has been made and from the tests the design would appear satisfactory. The air-stream is slower on the outside bends than on the inside, but this can be corrected by arrangement of the deflecting aerofoil in the ducts.

The R.A.E. are to replace their four-foot N.P.L. type tunnel with a 5 ft. one of the open-stream type in which experiments and tests will be made to obtain a better estimate of the performance of a large tunnel built to a similar design. [There is interest in noting that Eiffel, who published some of the first notes of aerodynamic research, has always used tunnels of this type.—ED.]

Mr. Wood said that a large or full-scale wind-tunnel would be of great value, for in this we can test the actual article and not a possibly imperfect representation. Much more confidence can obviously be placed in a test in which the engine is run under its own power. He thought it not unlikely that such a tunnel would disclose differences between models and actual aircraft which are not true scale effects, but due to imperfect reproductions.

The other interesting tunnel in the United States is the full-speed tunnel at Wright Field. Here the working stream is bounded by walls and is five feet in diameter. An air speed of 275 m.p.h. can be obtained in this tunnel and though it is used for general purposes, a tunnel of this calibre would be of great value in testing high-speed airscrews of the correct fine pitch for high-speed aircraft. In this country at the moment, owing to the limitations of low-speed tunnels, high-speed airscrews have to be tested as coarse-pitch screws only suitable for slow machines. Fine-pitch results have to be predicted.

Mr. Wood summed up by saying that we need not now discard the smaller atmospheric tunnel. It will be of immense value for many years. We shall always require, too, the free flight test, costly, slow, limited in scope and accuracy. But the future development of aeronautics demands the finer tools, the compressed-air tunnel, the full-scale tunnel and the full-speed tunnel. Great Britain should in his opinion, follow the lead of the United States in providing herself with all these implements.

THE DISCUSSION.

COL. SEMPILL, after referring gracefully to this summary of the American position, said that he saw sixteen officials from the various Government establishments who were not members of the R.Ae.S. and expressed the hope that they would come within the fold. He said that he thought the question that must arise as a result of the lecture was, how was it that the United States which ten years ago were so backward in research equipment had advanced so rapidly to the position they hold to-day. He said, referring to the blockage at the wind tunnels of the N.P.L. and the R.A.E., that serious support must be given to research work. He called upon Sir Richard Glazebrook to open the discussion and after him Mr. Wimperis.

SIR RICHARD GLAZEBROOK, who is Chairman of the Aeronautical Research Committee, expressed his appreciation of the paper. He recounted how pleased the A.R.C. were, when Mr. McKinnon Wood's name was mentioned as companion to Mr. Wimperis when the latter left for a trip to the United States. Referring to Mr. Wood's mention of the proposal for a compressed-air tunnel in 1921, Sir Richard said that he thought that it was not only lack of money that prevented the building of the tunnel but also a lack of conviction as to the value of the tunnel.

A result of his own visit to America was a series of tests which confirmed the need for the compressed-air tunnel in this country. There was as yet no definite allowance for the full-size tunnel but the discussion should remove this doubt. He described how the work in the wind-tunnels started 21 years ago, when Mr. Haldane, Lord Rayleigh and himself all met in Mr. McKenna's room in the Admiralty and started the preliminary work. This was as a result of Mr. Haldane perceiving the value of aeronautics as a weapon of war. He recounted how the meeting which considered the first paper which was by Lanchester on the pressure over a square plate called attention to the effects of Reynolds numbers. A member of this committee drew attention to the fact that Newton had very nearly discovered the Reynolds numbers. In fact Newton did discover this function but neglected to include ρ [=density of the air.]

He explained how the first tunnel built at the N.P.L. was completely enwalled and how to remove the eddies the N.P.L. developed the type of tunnel now in use where the air is enclosed at the point of observation but is allowed to expand into the observation room immediately after passing the fan. Sir Richard Glazebrook closed by saying how much we all owed to Mr. Wood's kind hosts in America. We were especially grateful for their frankness.

MR. WIMPERIS, who is the Director of Technical Research at the Air Ministry, referred to the timeliness of the paper in view of the development of the new tunnels in America. He thought that the frankness of Mr. Wood's American hosts was due in no small measure to

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Sir Richard Glazebrook and his Aeronautical Research Committee, who had always been in the closest touch with the N.A.C.A.

Referring more specifically to Mr. Wood's paper Mr. Wimperis said that he thought one of the hall-marks of ability was the power of clear expression. The answer to the question why has America progressed so rapidly, he thought, was to be found in the fact that the United States built nine out of ten cars in use in the World to-day, and they did not see why the same should not apply to aeroplanes. The N.A.C.A. were so pleased with their 24 ft. tunnel that they are acquiring a million dollars to build a 70 ft. tunnel. Mr. Wimperis closed with the fervent hope that we should get a full size wind-tunnel.

MR. HENKE, who is the Guggenheim Aeronautical Research Student now in this country, said the cordiality paid to Mr. Wood was being repaid to him a hundredfold. He had always envied this country their having the Royal Aeronautical Society, as they had no such body in the United States. He said that he thought that the staff at the N.A.C.A. should receive better training in the use of their marvellous equipment. He had learnt a lot while in this country. The application of so much money to aeronautical research in America was due in no small measure to Dr. Ames, in whom were combined the qualities of scholar and administrator.

MR. FARREN expressed his belief in the full-scale tunnel and thought it would be worth while building one immediately. He personally preferrred the full-scale to the variable-density tunnel. In a small tunnel there was great difficulty in reproducing all the parts in a model. There was also the question of how far we believed the present wind-tunnel results. There was besides Reynolds numbers the question of geometrical similarity.

The ordinary engineer would say that the aeronautical engineer's methods of obtaining results from a very small model for a very big thing was unique and without foundation. If one got the ordinary engineer to believe Reynolds numbers, he would then say make the tunnel full size and put a pilot in the machine. He would see walls and supporting struts. The wings instead of a canvas finish would be very smooth.

You might convince the ordinary engineer that you could make a satisfactory allowance for the walls but the moving air would be a form of standard air and not the free variety. These effects would be less in the big tunnel. The small atmospheric tunnel was very useful for reducing parasitic resistance, hence its use by design firms. No doubt it would be used for this purpose for many years to come. Mr. Farren concluded with a personal tribute to Mr. Wood.

MR. PIERSON congratulated Mr. Wood on his paper and said that he thought the chief use of the compressed-air tunnel would be for testing wings at the stall. He thought that the full-scale tunnel was very necessary as without it there was a lot of difficulty in obtaining the most satisfactory cowling for air-cooled engines. He agreed that the high-speed tunnel would be very useful for testing airscrews.

MR. RELF, who is superintendent of the aerodynamics department at the N.P.L., added his congratulations to the others. Both tunnels were required. One for *ad hoc* and the other for *basic* research. The large tunnel would give you quick results for small points. The compressed-air tunnel gave one a large range of Reynolds numbers. Mr. Relf, who is responsible for the design of the compressed-air tunnel now being built for the N.P.L., said that this had a 6 ft. jet and with 500 h.p. would have an air speed of 84 ft./sec. A model of the tunnel has been built and tested. There was no sign of vibration at the jet. To avoid air forces on the balance and to dispense with the American method of having small motors to move jockey weights, a system had been developed at the N.P.L. whereby the aerodynamic forces were balanced by electro-magnetic forces which could be accurately measured. He asked whether stalling the deflectors in Mr. Wood's tunnel did not cause turbulence.

MR. R. S. CAPON, who is superintendent of Scientific Research at the R.A.E., said that the large tunnel was especially valuable as an accelerator of research. The increase in 20 m.p.h. obtained from experiments in the American Propeller Research Tunnel was equivalent to two years' works by ordinary methods. He referred to the fact that a satisfactory transmission dynamometer had yet to be found.

DR. G. P. DOUGLAS, of the R.A.E., gave some figures about the compressed-air tunnel and said the working space of 1¾ diameters was better than American practice.

MR. TOWNEND, inventor of the Ring, who is definitely long, said he was glad to understand that tunnels were to be larger as he would then find them more comfortable to work in.

MR. MCKINNON WOOD, in reply, said that Mr. Douglas's statement about the 1¾ diameters was not quite right as the American tunnels used this distance. When telling a designer about wind-tunnel results he was always careful to explain that such results were only wind-tunnel results. He himself prefers a compressed-air tunnel and the most thrilling moment of his life was when he stepped into the only tunnel of such type in the world. He thought that the vibration at the jet was due to the outlet or collector having nearly the same diameter as the inlet. Stalling the aerofoils did not produce noticeable turbulence on account of the low wind speed. Referring to Mr. Capon's remarks about a dynamometer he thought that we should produce one when there really was need for it. He would like to take this opportunity of thanking, and placing upon record his gratitude to, his American hosts.

TECHNICAL PROBLEMS OF FLYING IN CANADA.

Sq. Ldr. D. C. M. Hume, R.C.A.F., recently gave a lecture on Technical Problems of Flying in Canada before the Westland Aircraft Society at Yeovil.

The subject had been announced as "Aircraft Operations in Canada," but Sq. Ldr. Hume said that he preferred to use the title given above. He also wished to make quite clear that any views he might express were his private opinions and were not necessarily shared by the Service.

Sq. Ldr. Hume opened his lecture with a brief geographical survey of Canada, and showed that for all practical purposes the country could be divided into four main belts. The first was from the West Coast to the Rockies, the second from the Rockies to the Middle West or Winnipeg district, the third from the Middle West to the Maritime Provinces and the fourth the great North-West area, which included the Yukon and barren wastes.

To get a rough idea of the extent of the country it could be considered as approximately 3,000 miles wide and 1,000 miles from North to South. The enormous size of the inland water surfaces could be judged from the fact that the whole of England could be placed in Lake Superior.

The climates of the several divisions were thus:—

In the Western belt, super-English, that is, there was a fair proportion of rain and sun and considerable humidity for the best part of the year.

In the middle prairie district the climate was dry, the country was bald and windy, and there were great variations in climate. There was a seasonal temperature difference of from 90°F. to minus 30°F.

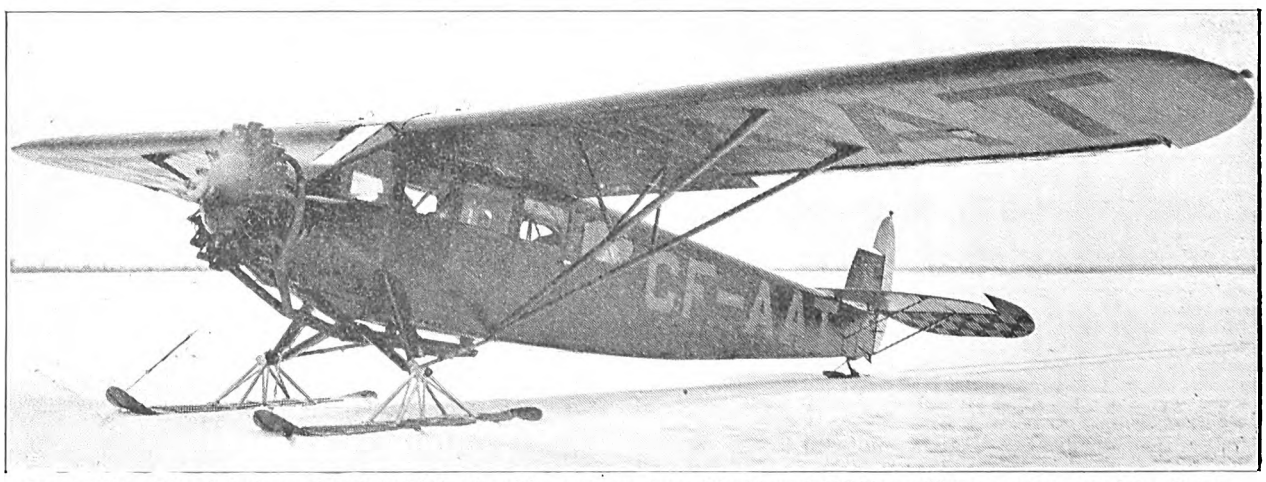
The Eastern sector was also subject to a wide temperature swing with the seasons. The land was mostly fertile, the humidity was high, but not so high as in the West.

As to the natural resources of the country, the Western district was well supplied with minerals and was very good timber country. The middle district with its intensity of change from season to season was ideal for cereals. And the East produced much timber for wood pulp, and was well supplied with minerals.

To the North was a vast deposit of bituminous sand as yet entirely undeveloped, which eventually might yield vast quantities of petroleum, etc. Of the North-West the bulk was largely unknown, but it was thought to be well stocked with minerals. In this district there was a very short summer of only two months.

After this brief introduction, Sq. Ldr. Hume passed on to a consideration of how aircraft were used in Canada at the present time. In the West, they were used for fish preservation, and the patrol had a good moral effect on the practice of illicit fishing. Forest fire-patrol was also done on, together with, a certain amount of air survey and air mail activities. The air mail was merely a natural sequel to the other flying and was really a secondary activity to the other services.

In the middle section there was air survey, the dusting of crops and prospecting for minerals, and the air mail.



ON SKIS.—The latest model Fairchild 71 cabin mono plane (Pratt and Whitney Wasp engine) used by International Airways of Canada for air mail transport.

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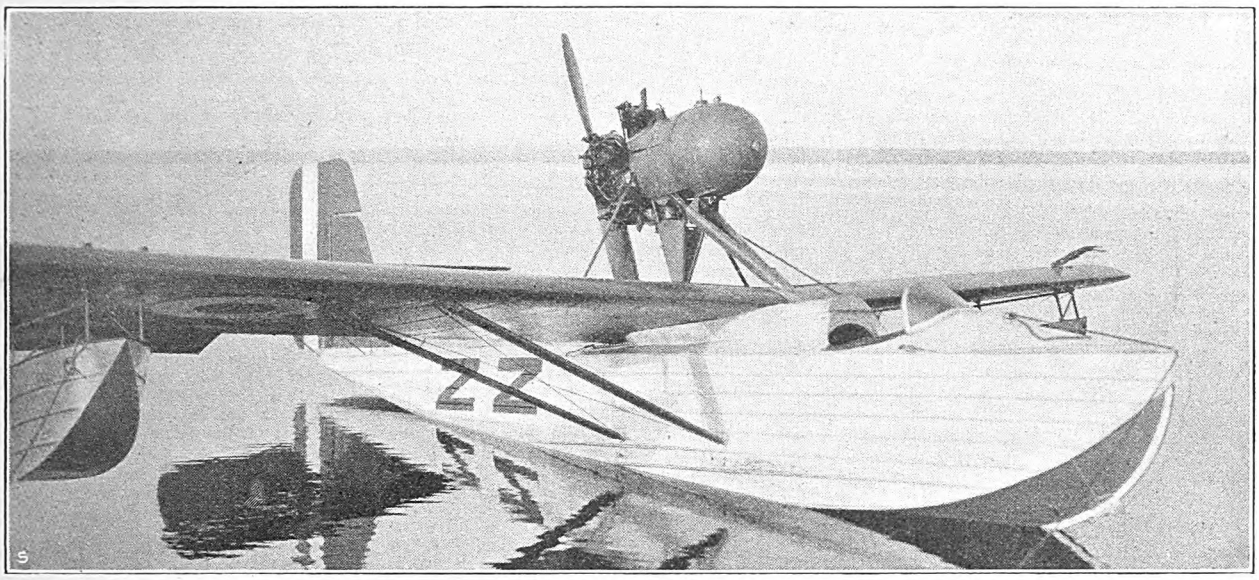

A LIGHT FLYING-BOAT.—The Canadian Vickers Vista (80 h.p. Armstrong Siddeley Genet engine), which was built to investigate the possibilities of using a light single-seat boat and for forest fire suppression.

In the East, timber cruising was becoming an important feature. This was formerly done by canoe or on foot, and was done to discover the extent and varieties of timber in various areas. By flying at 4,000 ft. it was possible to form an excellent estimate of the quality and distribution of the various kinds of timber from the air in a fraction of the time taken by the old method. Forest fire-patrol was also important, and prospecting, passenger flying, and air mail also claimed a certain amount of attention.

In the great Northern section, there was little beyond prospecting and mapping at present. The mapping of Canada was not half completed and at the present time there were vast areas North of the Canadian Pacific Railway which were mostly blanks on the map. These after air survey were found to be covered with rivers, lakes, and small islands, etc.

In 1928 the Royal Canadian Air Force took over the whole of the mapping work, and some 64,000 sq. miles were mapped in that year. The Topographical Survey Dept. of Ottawa had on their files more than a quarter of a million photographs from this source.

Sq. Ldr. Hume emphasised the importance of the forest fire-patrol. Wood pulp formed one of the largest industries of the country. Canada was one of the largest producers of paper, and supplied both Europe and the United States. Wood alcohol was also manufactured.

The soft woods were those that were used. These trees grow quickly and burn quickly. Fires start from any of a number of causes, and can be killed when still small by ringing round, by felling or by pitching the fire towards water. But if the fire gets a large hold, nothing but a change of wind or fall of rain can do anything to stop it. It is therefore very important to get fire-fighters on the scene while the fire is yet young.

Consideration of these activities show that the position of Canada from a flying point of view is unique. There is no question of educating the people and of getting them airminded as in this and other countries. Aviation is already an accepted fact, and the work is already there waiting to be done. The use of aircraft in these various ways has shown the great advantages of the new method of transport, and aviation is firmly established with a sure future.

The Royal Canadian Air Force is divided into two sections, the military side, which is actually the less obvious of the two, and the Civil Government Air Operations Section which does air work for other Government Departments.

The aircraft of the country have to be adapted to the conditions of the country and the climate, which conditions are common to both the Military and the Civil side, and, secondly, to meet any special conditions consequent upon the special occupations in which the aircraft are used. These conditions were particular to the Civil side.

CLIMATIC PROBLEMS.

Considering the effect of the climate on the aircraft, taking first the air frame (that is the aeroplane without its engine and other parts of the power-plant), Sq. Ldr. Hume says that the seasonal variations produce in wooden and mixed structures a severe change in size. Such a change may be brought about by merely moving the aircraft from one part of the country to another where conditions may be quite different.

In one instance, where wooden wings had been made of specially seasoned timber the shrinkage of the spars had been so great that all the ribs had broken. The Lecturer mentioned that the method of seasoning spruce is to season for two years in the open air, protected from the worst of the weather, and then for one year indoors where the conditions, humidity, temperature, etc., are under control.

Another trouble experienced is the forming of blue stain, a form of bacteriological fungus on the wood and also on glues, especially in seaplanes, where the cultural conditions were evidently favourable to the formation of this trouble. So far as doping was concerned they had found nothing deleterious to the dopes used. Nitro-cellulose dope was standard. Rubber was found to be of no use in the extremes of climate. They had had no evidence of fatigue in metals due to the extreme cold, a point about which there were often questions raised.

Analysing these results it is clear that an all-metal machine of very sturdy design is called for. Aircraft in Canada are subjected to rough usage, and structural repairs have to be made as easy as possible. The "Meccano" principle of construction, in which members could be easily replaced, is an ideal to be aimed at.

MECHANICAL PROBLEMS.

Coming to the question of engines, before efficient air-cooled engines were available, water-cooled engines had to be used, and these gave rise to obvious difficulties in the cold in winter. Freezing is experienced on the one hand, and yet large sized radiators have to be used for use in the heat of Summer. In Winter the use of the water-cooled engine means draining the water system and refilling every time, or else some means have to be adopted for keeping the engine and water from freezing up. The method favoured most is a combination of a special mixture, consisting of 40 per cent. wood alcohol with 60 per cent. water.

The difficulty of evaporation loss has been solved in a very simple way. The pipe from the radiator outlet is taken to a small vessel, which is provided with cooling coils, with the result that the vapour condenses and is led back to the system again. By this means not more than 5 per cent. loss of alcohol happened during the season.

In lubricating oils they found that a mixture of 5 parts of Arctic to 3 parts of B.B. Mobiloil had proved satisfactory for the coldest weather. And a 50-50 mixture had been satisfactory for temperatures down to 5° F. By intelligent mixing in this way, they had been able to eliminate lubricating oil troubles. It was necessary to have the oil pipes and oil tank, which were in the slip-stream, lagged with asbestos or some similar material to prevent undue cooling.

Cold weather starting is a problem but they are able to reduce these to a simple matter of routine. This is briefly as follows:—The engine is first doped with about half a pint of petrol to ease up the pistons, the petrol acting as an oil-solvent rather than as a dope. In water-cooled engines, of course, the water is previously drained to avoid cracking troubles and water pumps freezing up, etc. The engine is next doped with about a quarter of a pint of petrol-ether mixture in the intake manifold. Finally the engine is again doped with a quarter of a pint of petrol-ether mixture and the engine should then start in the ordinary way, after which it should pick up and run on petrol.

They have found by experience that this process needs a certain amount of watching on small points. For instance the priming nozzles have to be of sufficient size or they freeze up. Actually a grease-gun of 1½-inch diameter and 7-inch stroke is used.

The quantity of dope is important as too much or two little prevents an easy start. Starting in temperature of 20°F. and over is possible with a straight petrol dope. From temperatures of 20° down to 0° a mixture of three parts of petrol to one of ether has been found suitable. From 0° down to minus 15°F. equal parts of petrol and ether are used. And from minus 15°F. to minus 30°F. or thereabouts, experienced in the worst of the cold districts, pure ether is used. During these operations the throttle is set at about one-fifth opening.

In starting air-cooled engines, such as the Whirlwind, they have evolved a simple system which consists of an asbestos bag fitted right over the engine. This has a trunk tube which leads down to a length of stove-pipe at the end of which is some fine gauze. Into the end of this stove pipe, which has an elbow, are directed the flames from two normal type petrol blow-lamps for half an hour. Hot gasses are thus made to circulate round the whole engine, and, using warmed oil, a start is made.

It has been found possible in a Jaguar-engine in a Siskin at a temperature of 5°F. to make a normal start by turning the engine round six times after doping. A start can be made by holding a hot brick near the mouth of the air-intake, and ether can be sprinkled on the brick.

Coming to fuels for high-compression engines, petrol-benzol mixture is of no use whatever, as the benzol separates out in the cold and benzol vapour forms a species of snow and blocks up the passages. An ethyl compound (tetra-ethyl-lead) is used (5 c.c. of ethyl compound to a gallon of petrol, which was later reduced to 3 c.c. per gallon).

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The only trouble resulting from the use of this mixture is the pitting of aluminium-bronze valve seats. The mixture seems to eat right into the metal, and to get over this difficulty the valve-seats have been replaced by special seats of K.E. steel, which is satisfactory.

A point to be watched is that whenever an engine is shut down for any considerable time internal condensation takes places, and all the plugs have to be taken out and dried.

FLYING PROBLEMS.

They found that hinges and controls should not be exposed. Particularly during the "half-season," and especially in seaplanes, such exposed parts were liable to be frozen up solid and all controls locked. The machine might be covered with moisture when flying through a snowstorm, and become covered with ice, which would cause trouble with the controls. Greasing helped to a certain extent, but the movable portions of the controls should be so arranged that they were not exposed in any way.

The general design of aircraft should provide for getting off and alighting in comparatively small spaces. In Summer the seaplanes may have to alight on any convenient small lake, the banks of which are often timbered with 40 ft. trees which naturally reduce the available area considerably. A good get-off is essential under such conditions.

Sturdiness of construction is absolutely essential as a machine may be away for three months with only the crew to do any repairs or overhauls.

One difficulty with seaplane flying is due to striking submerged logs. Some of the logs sent down the rivers get water-logged and float a little under the surface where they cannot be seen, and several hulls had been holed in this way.

For alighting in Winter wheels are of no use except on glare ice or packed snow. On soft dry snow skis are the only method. The ordinary type of undercarriage is more or less suitable. The legs should be of the oleo type and the oil of a kind that sets at a low temperature. A suitable mixture has been found to be 20 per cent. paraffin (called in Canada coal oil) and 80 per cent. Mobiloil A.

The skis now used are of laminated planks of ash faced with 12-gauge aluminium. They are supported on an arrangement of tubing encased in a form of pot. The skis must be made interchangeable with wheels and a quick change-over is necessary as a machine might be landing on snow in one flight and grass in the next.

To get over the changing process special wheel skis had been designed, but had not met with much success. The wheel is fitted in a slot in the skis, and nearly always gets choked up with solid snow.

The skis have had to be faced with metal because of rocks embedded in the snow which rips up the wooden skis. All-metal skis have been tried. They can be made quite light, but are subject to damage by rocks and hard lumps in landing and need the backing up of the wood Skis with corrugated undersides have been tried out, and at first they thought that the corrugations would prevent side slipping. The theory was wrong, for a certain amount of side slip is absolutely necessary when landing. Also the corrugated surface presents more area for contact with the snow, and needs more breaking out after freezing in.

A suitable specification for the skis for a 5,000 lb. machine entails a loading of some 200 lbs. per sq. ft. with a cross-sectional area of saucer form, that is with a flat bottom and slightly turned-up sides. These turn-ups are necessary, as the skis move sideways and the rounded edges enable them to ride up on the snow. The bottom of the skis are flat and metal covered, with the front turned up. The rear end should also be turned up to ease the man-handling of the machine, for skis cut off square at the back dig into the snow when the machine is pulled backwards. The skis should not weigh more than some 90 lb. each. This is the weight as at present made.

Some way of restraining the movement of the skis in the air is needed. A normal angle of plus 2° to the chord of the wings is suitable and the first method used was by a cable fore-and-aft with rubber insertions. Later telescopic spring-loaded legs were fitted, but they were rather fragile and easily bent if roughly handled. The latest and best method was the fitting of axle springs which could be placed inside the fairings of the ski supports and added no head resistance.

For a landing on skis it has been found that the height of the ski pot (i.e., from the axle to the bottom of the ski) should equal the length of the ski behind the axle. An aspect ratio of 5 to 1 has been found satisfactory. And the resultant of the weight-line must fall behind the centre of side-resistanece.

Another matter to be considered is the need for robust mooring arrangements, anchor rings, etc. The easiest and most satisfactory method of mooring aircraft in snow is to take an ordinary sand-bag, tie it round the middle with a length of line, dig a hole in the snow, and lay the sand bag in it. Then water is poured in, and the hole filled with snow, and the machine anchored to the line. The anchor freezes so solidly that the line has to be cut to release the machine.

Sq. Ldr. Hume remarked that although he had said so much about Winter conditions, it is not all winter flying in Canada. Summer flying was done in hot fine weather, but this caused no very particular difficulties.

He offered some suggestions about design of a machine for special duties in Canada, one of which concerned the question of standards. He advised the use of the S.A.E. standards of the U.S.A. for screw-threads, etc., as they could get supplies of spares from America "over the counter," as it were, within 5 days, whereas it took 5 weeks to get anything from England.

Floats had to be extremely sturdy. An amphibian gear would be useful, as this would reduce the time in getting the machine out of the water. A simple arrangement was the removable axle which could be passed through the float for landing purposes. At the bases they could use a trolley with pneumatic-tyred wheels or a small trolley for each float or axle.

The dusting of crops to eradicate white-pine blister-rust has been done satisfactorily, but it caused a peculiar difficulty with duralumin. Severe corrosion had occurred in a machine at the Halifax station. In half a season the floats had been badly pock-marked, and some holes were right through. This was thought to be due to chemical action, due to calcium arsenite or sulphur, used for the dusting, in conjunction with salt water. The latest development in this connection was the fitting of Alclad floats, but the Lecturer did not know with what results.

The use of the Inertia Starter was to be encouraged.

The combination wheel-ski was a device which needed further experiment.

Some of the prime requirements in Canadian aircraft of the immediate future included the following:—

The machine must be suitable for taking vertical and oblique photographs for aerial survey.

It should be a three-seater machine for pilot, photographer and navigator, with a good view for each.

It should carry 1,000 lb. of payload and should be a sea, land, and snow plane equally.

Designers must remember that there are no hangars except at the bases.

The machine should have an air-cooled engine and a metal airscrew, preferably of the split-boss type. This type of airscrew with blades of duralumin is favoured because, by setting the blades, the number of spares to be kept in stock can be reduced For instance, it was found possible to use blades of the same plan form to give two entirely different settings. Thus the number of spares was reduced from four to two.

The machine should be of all-metal construction, simple and robust, and have a service ceiling of 15,000 ft. as a seaplane.

THE DISCUSSION.

MR. JOHNSON asked for details of special personal equipment carried.—ANSWER:—Face-masks were not used, as closed machines were essential for Winter flying. Fleece-lined equipment was used, and in addition a game-getter's gun of .22 bore and fishing lines were carried. Fire fighting equipment was also carried as a rule.

MR. BRIGHAM asked whether they had had trouble with plywood.—ANSWER:—Most of the plywood came from England as it was not made to any extent in Canada, and that the same tests applied there as here. Care had to be taken not to get the plywood soaked with water, or it would freeze and disintregate.

CAPT. HILL asked what type of anchor was used with seaplanes.—ANSWER:—Machines could generally be beached, as the lakes shelved quite sharply. Or they could be anchored to trees on the shore quite easily. Incidentally lake water was generally drinkable, and caused no corrosion.

Capt. Hill further asked whether the air temperature dropped off with height in the same ratio as it does in England, and was told that the same laws held good.

MR. GIBSON asked whether any trouble had been experienced with the Fokker 3-ply covered wings.—ANSWER:—The wings apparently functioned all right, but they had no machines of this type in the Service, and he could not speak from experience. He understood that in the South trouble had been found, through fungus growth.

Mr. Gibson further inquired whether any cylinder scoring had been experienced due to the lubricating oil being washed out by the excessive doping at starting. The answer was in the negative.

Replying to Mr. Davenport, Sq. Ldr. Hume said that the chief difficulty in landing on smooth ice was due to skating with nothing to stop the machine. The chief danger was the broken surface of the ice. Exhaust-heating of cabins was regular practice. Electrically-heated clothing was not used, because of the weight of batteries. Most of the machines used for Winter flying were not the same as those used in the Summer, and this simplified the problem somewhat as the machines could be specially adapted for the seasonal requirements.

MR. R. A. BRUCE inquired whether the windows of the enclosed machines had been found to coat with snow or ice and become opaque. ANSWER:—No such trouble had been found. A rub with a glycerine rag was all that was necessary to keep the windows clear. A certain amount of trouble had been found in landing on snow after a storm owing to the intense dazzle which was apt to give a false impression of height.

MR. GIBSON stated that in France they had found amber goggles of great help in this matter. He would also like to ask whether glass or celluloid was used, for the windows. ANSWER:—Non-splintering glass was always used. Celluloid was of no use owing to oily discoloration.

Closing the Meeting Mr. R. A. Bruce said that the Westland Aircraft Works had recently sent a machine to Canada and much of the information which had been given by the Lecturer would have been very valuable then.

A RIB MODIFICATION.

Air Ministry Notice to Aircraft Owners and Ground Engineers No. 2 of 1930 draws attention to a necessary modification to the attachment of the ribs to the front spar in D.H. Moths, types X, G and M.

The modification is shown on the De Havilland Aircraft Co. Ltd. Drawing No. M. 1226, Issue 4, which can be had from the company at Stag Lane Aerodrome, Edgware, Middlesex.

THE USBORNE MEMORIAL PRIZE.

The Royal Aeronautical Society announces that the Usborne Memorial Prize for the year 1929 has been awarded to Mr. F. G. Evans for his paper entitled "The Cross-Section of the Semi-rigid Airship."

The Usborne Memorial Prize is offered annually, at the discretion of the Council, for the best paper by a Student on lighter-than-air craft.

A FRESH START.

On Jan. 24 Man Mohan Singh made a fresh start from Lympne in his attempt to win the £500 prize offered by the Aga Khan.

THE AEROPLANE of Jan. 15 contained the report of his start on Jan. 11 which ended at Noyon with a broken airscrew.

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CANADIAN VICKERS AIRCRAFT.

During the past year Canadian Vickers Ltd. of Montreal, P.Q., produced thirty-six complete aircraft which were delivered to the following: the Dominion Government, the R.C.A.F., the Ontario Provincial Government, the Chilean Government, Western Canada Airways, Northern Aerial Minerals Exploration Ltd., International Airways of Canada Ltd., Canadian Airways, Dominion Airways, General Airways, and the Pigeon Timber Co.

These aircraft were of the following types: Twenty-four Vedettes, fifteen of which were flying boats and nine flying-boat amphibians, one Vancouver twin-engined experimental flying-boat, eight Fokker Super-Universal monoplanes, one Fokker Universal seaplane, and two Fairchild F.C.2 monoplanes.

Their present programme consists of an order for eleven Vedette Mk. V-A flying-boats for the Dominion Government, three Vedette Mk. V-A amphibians for the R.C.A.F., and six Vancouver Mk. II twin-engined flying-boats for the Government. All the Vedettes will be fitted with Handley Page automatic slots. The flying-boats will have a specially designed undercarriage type of beaching gear. The company is also building to the order of the Dominion Government an experimental Vedette with a metal hull.

The Canadian Vickers Vedette.

The Mark V version of the Vedette is a three-seat flying-boat designed primarily for forest fire detection. It has also proved most successful on photographic and survey work. The engine normally fitted is the 300 h.p. Wright Whirlwind (J-6), but it may also be equipped with either the 225 h.p. Wright J-6 or the 220 h.p. Armstrong Siddeley Lynx engine.

TYPE.—Three-seat flying-boat for forest fire detection and photographic survey work.

WINGS.—Single-bay biplane. Top centre-section carried above hull on steel-tube struts, with one pair of interplane struts on either side of hull. Wing structure of wood, covered with fabric. "Frise" type ailerons fitted to all four planes.

HULL.—Two-step hull, with Vee bottom and domed top. Of semi-flexible or monocoque type, the ribs being hoop-shaped and fixed rigidly to the keel. Cedar planking, with copper rivetting, is used throughout, the top planking being 3/16 in. cedar and the bottom ¼ to 3/16 in. from front to rear. The whole hull is covered with two layers of canvas. May also be supplied with a metal hull built of duralumin on the longitudinal method of construction.

TAIL UNIT.—Monoplane type. Tail-plane carried near top of fin and is braced to hull with steel struts. Balanced rudder. Adjustable tail-plane.

AMPHIBIAN GEAR.—Permanent retractable wheel-landing gear, of the Vickers Viking type. Wheels interchangeable with skis.

POWER PLANT.—One 300 h.p. Wright Whirlwind (J-6) air-cooled radial engine, mounted under top centre-section and driving a pusher airscrew. Rear truss of centre-section, which carries engine, in form of an "X." Main petrol tank in hull, and a gravity fuel tank and oil tank are under centre-section and form fairing to engine. With the metal hull the fuel tanks are carried in the lower planes.

ACCOMMODATION.—In nose of hull is a large cockpit for observer or photographer. Under leading-edge of wings is the pilot's cockpit, seating two side-by-side, with pilot on starboard side. With the metal hull and fuel tanks in lower planes, additional baggage space is provided. An additional feature is the covering in of the pilot's and observer's cockpits with detachable covers.

DIMENSIONS.—Span 42 ft. (12.8 m.), Length 32 ft. 11 in. (10 m.), Height (flying-boat) 11 ft. (3.35 m.), Height (amphibian) 12 ft. 6 in. (3.8 m.), Wing area 478 sq. ft. (44.4 sq. m.).

WEIGHTS (Flying-boat).—Weight empty 2,700 lbs. (1,225.8 kg.), Pay load and pilot 1,300 lbs. (590.2 kg.), Weight loaded 4,000 lbs. (1,816 kg.).

WEIGHTS (Amphibian).—Weight empty 2,910 lbs. (1,321.1 kg.), Pay load and pilot 1,090 lbs. (494.9 kg.), Weight loaded 4,000 lbs. (1,816 kg.).

PERFORMANCE (Flying-boat).—Maximum speed 110 m.p.h. (176 km.h.), Cruising speed 94 m.p.h. (150 km.h.), Landing speed 50 m.p.h. (80 km.h.), Initial rate of climb 600 ft./min. (183 m./min.), Service ceiling 13,000 ft. (3,965 m.), Cruising range 4½ hours.

PERFORMANCE (Amphibian).—Maximum speed 107 m.p.h. (171.2 km.h.), Cruising speed 92 m.p.h. (147.2 km.h.), Landing speed 50 m.p.h. (80 km.h.), Initial rate of climb 580 ft./min. (177 m./min.), Service ceiling 12,400 ft. (3,782 m.).

The Canadian Vickers Vancouver.

The Vancouver is a twin-engined flying-boat fitted with two Armstrong Siddeley Lynx IV direct-drive engines.

The machine was designed to a specification prepared by the R.C.A.F. for use in connection with the suppression of forest fires, its duties being to transport men and fire-fighting equipment to fires reported by regular aerial fire patrols.

Low landing-speed, quick take-off and high initial rate of climb are essentials for this type of work, as the only available landing places adjacent to or actually in the forests are small lakes surrounded generally by thickly-timbered hills. The Vancouver has been designed with these three primary considerations in view.

TYPE.—Twin-engined flying-boat for fire-suppression duties.

WINGS.—Equal-wing, unstaggered biplane. Clark "Y" wing-section. Construction of normal two-spar type, spars and ribs being of spruce and the internal bracing of duralumin struts and steel tie-rods. One pair of vertical steel-tube interplane struts on either side of engines. "Frise" type ailerons on bottom plane only.

HULL.—Entirely of duralumin, the construction being of the longitudinal type. The skin is supported internally by frames and a series of longitudinal stringers, these latter being continuous through all frames and bulkheads. Three water-tight bulkheads, extending the full depth of the hull, divided the hull into four water-tight compartments.

TAIL UNIT.—Monoplane type. Entire framework of welded steel tubes, covered with fabric. Balanced rudder. Adjustable tail-plane.

POWER PLANT.—Two 220 h.p. Armstrong Siddeley Lynx IV air-cooled radial engines, mounted as tractors between the wings on welded steel-tube nacelles, which also carry the oil tanks. No front engine-mounting interplane struts. Main fuel tanks (2) in top centre-section, with gravity feed to the engines. Two reserve tanks in bottom centre-section, with hand-pump feed to top tanks. Standard Steel airscrews.

ACCOMMODATION.—There are two cockpits and three hatches. The pilot's cockpits, with dual control, are forward of the wings and in tandem, giving excellent view and permitting a clear walkway inside, so that all parts of the hull are accessible without interfering in any way with the pilots. The mooring hatch is in the nose and is furnished with every convenience for the stowing and handling of towing and mooring gear. The main cabin is immediately aft of the cockpits, and is separated from the internal walkway by a watertight bulkhead in which is fitted a watertight door. To help the loading of freight, the front cockpit is extended transversely, the extended opening being fitted with a hatch. The normal entrance to the main cabin is through a large quickly detachable hatch in the top of the hull. Collapsible seats are provided for six passengers and there is sufficient room to stow a large quantity of equipment, even when all seats are occupied. The cabin is lighted by the entrance hatch and six ports. Aft of the main cabin, provision is made for stowing a collapsible canoe. The interior of the hull has been kept very clear of obstruction, so that quick loading and unloading is possible.

BEACHING GEAR.—A novel beaching gear has been designed for use with this machine. This gear is so arranged that it can be readily attached by the crew while the machine is on the water. The tail support consists of a pneumatic wheel which, by an ingenious arrangement, can be attached and locked from the deck

A CANADIAN AMPHIBIAN.—The Canadian Vickers Vedette Mk. V (Armstrong Siddeley Lynx engine) with amphibian gear.

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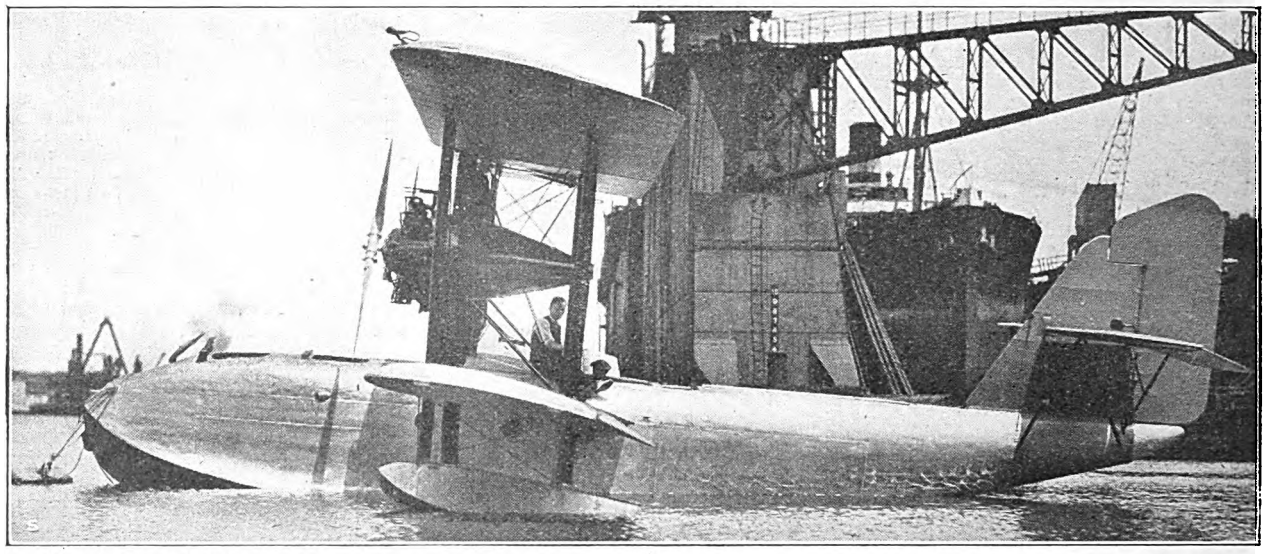


FOR FIRE SUPPRESSION.—The Canadian Vickers Vancouver (two Armstrong Siddeley Lynx engines) designed to transport men and fire fighting equipment to forest fires.

in the bottom of the hull just aft of the rear step. The machine can then be beached without outside assistance.

DIMENSIONS.—Span 55 ft. (16.8 m.), Length 37 ft. 6 in. (11.4 m.), Height 15 ft. 8 in. (4.7 m.), Wing area 772 sq. ft. (71.8 sq. m.).

WEIGHTS.—Weight empty 4,300 lbs. (1,952 kg.), Fuel and Pay load 2,010 lbs. (913 kg.), Weight loaded 6,310 lbs. (2,865 kg.).

PERFORMANCE.—Maximum speed 101 m.p.h. (161.6 km.h.), Cruising speed 90 m.p.h. (144 km.h.), Landing speed 45 m.p.h. (72 km.h.), Initial rate of climb 650 ft./min. (198 m./min.), Service ceiling 12,500 ft. (3,812 m.), Range at cruising speed 400 miles (640 km.)

The Canadian Vickers Vista.

The Vista is a small single-engined flying-boat which was designed for the Canadian Air Board to investigate the practicability of forest fire patrol with single-seat aircraft. The hull is of metal but the wings are of the conventional wooden construction. The power unit is an Armstrong Siddeley Genet engine driving a pusher airscrew.

This type has also been fitted with an amphibian undercarriage of a type similar to that fitted to the Vedette. The wheels of this undercarriage are interchangeable with skis.

Canadian Vickers Ltd. also holds the licence to build Fokker aircraft from the American Fokker Aircraft Corporation. The types built are of the well-known Tri-motor, Super-Universal, and Universal types, which are sufficiently well known to make descriptions unnecessary.

THE TESTING OF RIBS.

An interesting piece of apparatus for testing wing ribs has recently been designed and erected at the Whitley Works of Sir W. G. Armstrong Whitworth Aircraft Ltd.

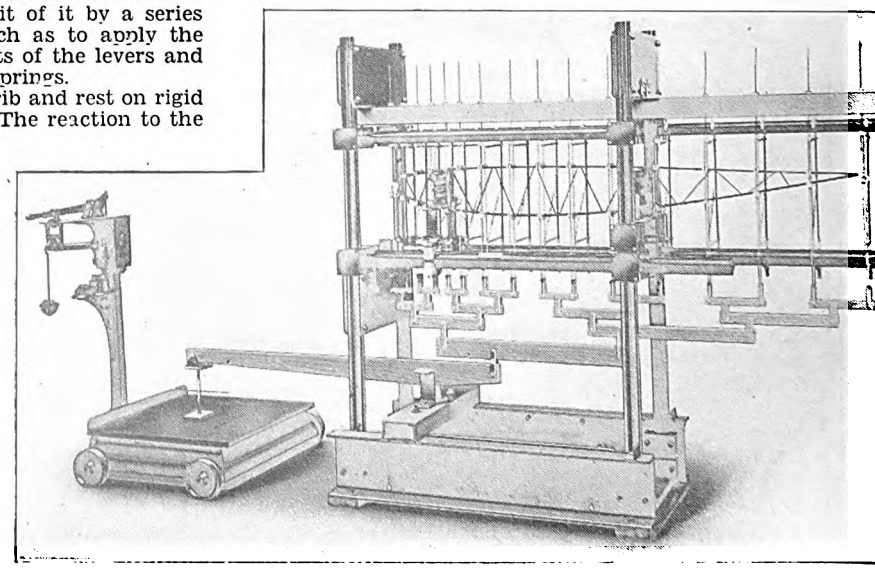
For the proper testing of ribs the load must be applied in a manner approximating as closely as possible to the conditions that obtain in the air. This apparatus has therefore been designed to apply loads at a series of points along the rib. The distribution of loading is determined from the pressure-curves which conform with the conditions under consideration.

The rib is held in a frame-work which provides the lateral support normally supplied by the fabric and stringing. This frame-work is free to move vertically without friction and a downward pull is exerted on each unit of it by a series of levers. The lengths of these are such as to apply the required load at each point. The weights of the levers and framework are supported by adjustable springs.

Short lengths of spar are fitted in the rib and rest on rigid supports on which the spars may pivot. The reaction to the applied load is given by these supports.

Above each unit of the frame-work is an adjustable device which permits only a small downward movement. Therefore when failure of the rib occurs, the distortion remains local and is not communicated to other parts of the rib.

This makes the subsequent inspection of the point much easier, and makes possible the local strengthening of the rib if this is required.



The Armstrong Whitworth rib-testing machine which will apply loads to a test rib in a manner approximating as closely as possible to conditions in the air.

AERODYNAMIC RESEARCH IN GERMANY.

On Feb. 6 at 18.30 hrs., Mr. J. W. Maccoll will lecture on Modern Aerodynamical Research in Germany, before the Royal Aeronautical Society, 18, John Street, Adelphi, W.C.1.

Mr. Maccoll has been making a special study in Germany of the latest research into the motion of incompressible fluids. Mr. Maccoll has been in close touch with Professor Prandtl, Professor Betz, and Professor von Karman.

The paper will be divided into three parts. First is the theory of the boundary layer and its application for laminar and turbulent conditions.

The second part is an account of the experimental investigations and theoretical work on the development of turbulence.

The third is a description of the work now being done at Goettingen and other German laboratories to determine the characteristics of fully-developed turbulence.

MORE ABOUT THE AUTOGIRO.

On February 13 at 18.30 hrs. Senor J. de la Cierva will read his lecture on the Autogiro before the Royal Aeronautical Society at 18, John Street, Adelphi, W.C.1.

Senor de la Cierva will explain in detail the progress of the autogiro since 1925. He will also describe how since 1925 he has developed a theory which enables design to go farther than was possible at that date.

The lecturer will endeavour to show that the autogiro must ultimately travel faster than the corresponding aeroplane. He says further, "In the present state of knowledge I am satisfied of the possibility of designing autogiros with a top speed of 200 m.p.h., and landing exactly the same as the light autogiros of the latest type.

The autogiro always attracts so much interest that doubtless a large number of people will welcome this opportunity of hearing its inventor describe the results of his latest investigations.

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NEW EQUIPMENT FOR THE PRESS SHOP.

All new service types of aircraft have to be of all-metal construction. This implies the equipment of an aircraft factory with special metal-working plant. Manufacturers who have so equipped themselves are more likely to design and produce commercial aircraft in metal than wood. New metal-working equipment is therefore of special interest to the Aircraft Industry

A feature of all-metal construction is the diversity of parts that can be produced in the press shop. Besides actual parts such as clips, small details, corrugated floorplates, frames for portholes, which are themselves pressed out of sheet metal, bigger parts such as bulkhead diaphragms, and similar parts with large area have lightening holes punched in them, and these lightening holes are afterwards flanged on the press.

The making-up of a press tool entails considerable work and expense in the tool-room. Such tools therefore must be made to last as long as possible. Of the various types of press tools, blanking tools are probably most liable to wear and accident.

The simplest form of press tool must consist of a punch, die and what is known as a "stripper"-plate. The punch accurately fits the die and therefore the parts must be so mounted on the press that the parts are in perfect alignment. This setting-up is quite a lengthy job for a skilled operative.

Because of the jarring caused by the punching operation taking place with such frequency the punch has a tendency to wander. If the punch only wanders to the extent of a few thousandths of an inch the punch and die will wear badly on one side, unless the operator notices the trouble in time and stops the press.

This difficulty can be obviated to a large extent by making the "stripper"-plate accurately fit the punch. This plate will then form a guide and prevent the punch and die from getting out of alignment.

There are two objections to the use of the "stripper" as a guide. First is the expense of making it. Second that the method is only suitable for short stroke presses. On a long stroke press the punch will leave the "stripper"-plate and thus destroy its value as a guide.

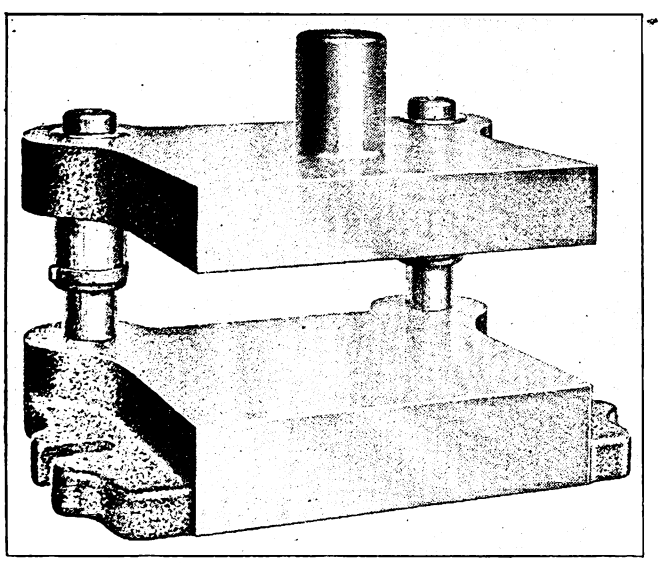
These troubles are serious enough when a new press with well-fitting guides is used. But when the press is old and worn these troubles are increased by the slack fitting of the ram.

These difficulties can be surmounted by the use of pillar-type sub-presses or die-sets. The use of such sets is a growing practice in modern shops. These die-sets are usually made separately and specially for each job. They are therefore expensive to make, although much better results are obtained with them than by the use of the "stripper"-plate as guide.

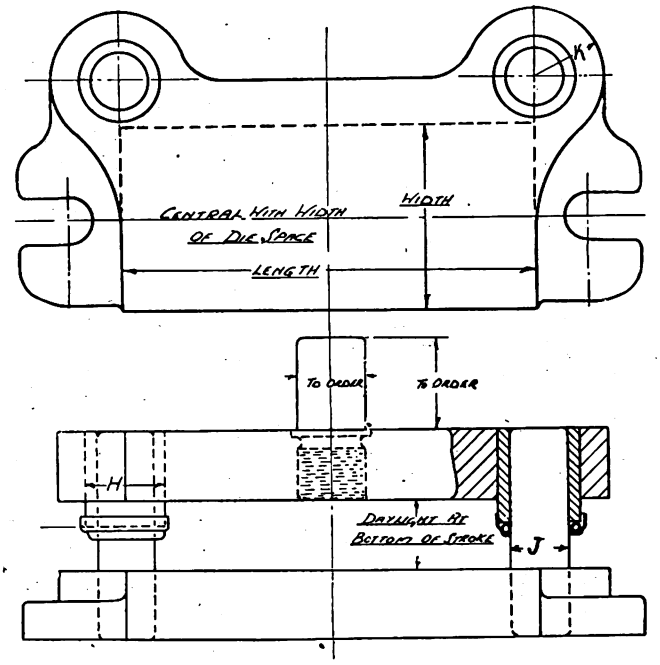
Desoutter Brothers Ltd., of the Hyde, Hendon, N.W.9, have for some time past been marketing a range of standardised die-sets which should appeal particularly to aircraft manufacturers.

These die-sets consist of a die-base, punch-holder and guide-pins. The pins work in steel bushings. There are eleven standard sizes of die-set. The punch-holders and die-bases of any given set are interchangeable. Thus replacements can always be supplied from stock without delay,—a valuable feature.

The opposing faces of the die-base and punch-holder are ground flat and parallel to each other. The faces of the front sides are ground flat and square to face. At the back of the die-base are two hardened and ground steel pins which accurately fit two hardened and lapped steel bushes in the punch-holder.



The Desoutter Standard Die Set.



A drawing of one of the Desoutter Die Sets. This is one of the "L" Sets with a big length: width ratio.

At the bottom of each bush are two wick-filled oiling-rings which ensure that the guides are properly lubricated. The shank of the punch-holder can be supplied in any size to fit the ram of the press.

The die-base is made with standardised slots and thickness of lugs to make for ease of setting on the press. These bases are usually supplied in a good grade of cast iron. These bases (not the punch-holders) can be supplied in steel at a slightly increased cost.

The method of using these sets is straightforward. The die is mounted on the base. The simplest kind of "stripper" is all that is needed as it merely has to strip, and not serve the further purpose of guide. This saves costly labour in the tool shop. A clearance hole is cut in the base for the stampings.

The punch is fixed to the punch-holder. Thus the punch and die are in perpetual alignment. In use the set is drawn complete from the stores, the die-base is bolted to the table and the punch-holder to the ram. The press is adjusted for the height of stroke and the tool is ready without any aligning.

Managers will realise the value of the time saved by buying such standardised parts as these sets. New designs can be put into production more quickly, for by the use of these sets half the work of making-up press-tools can be saved. The prices at which these sets are sold enables people to avoid this part of the work of making-up at a considerable saving of money.

The only particulars required in ordering are the "size number," which is got from Desoutter Bros.' list; the daylight or clearance between the punch-holder and die base at the completion of stroke; the diameter and length of shank of the punch holder; and finally whether the light or heavy punch-holder and/or base is wanted.

A NEW TYPE OF WHEEL BRAKE.

The Sikorsky Manufacturing Corpn. have been investigating the problem of wheel-brakes for their large twin-engined amphibian. The problem of fitting brakes to the wheels of a retracting undercarriage has presented many difficulties.

The company has experimented with the various types of standard wheel-brakes on the American market, but in the end it has been compelled to produce one of its own design to suit the particular requirements of its amphibian. The result is the Sikorsky Multiple Disc Brake.

This brake consists of three stationary units, each comprising three radial arms set at 120 degrees. Between the extremities of the arms, and normally free to revolve are two rings which are attached to the wheel rim. The ends of the arms are provided with brake-lining. The outside and inside arms have lining rivetted to the inner sides, and the middle arms have lining rivetted to both sides.

On each of the arms is a small cylinder connected by flexible piping to two hydraulic cylinders in the cockpit which are operated by the normal brake pedals.

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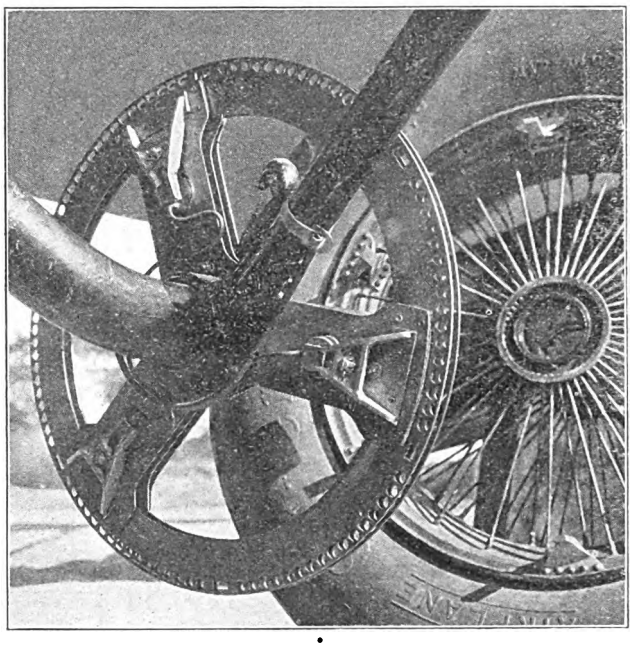


The Sikorsky multiple Disc wheel brake dissembled.

Each of the small cylinders has two pistons connected to rocking arms so that when pressure is applied the pistons travel outward and the outer extremities of the rocking arms tend to clamp the three stationary arms and the revolving rings together.

The two revolving rings are anchored to the wheel rims by three tongues rivetted to the rims and passing through slots in the rings. This permits the use of any type of standard wheel except for the three light tongues.

Uniform pressure is obtained over the braking area without undue weight. The three stationary units are .062 ins. (sixty-two thousands of an inch) thick, but as the placing of the metal is in line with the stresses these three units transmit a torque of over 25,000 inch-pounds to the axle.

The new Sikorsky brake has been quite satisfactory in operation and free from any troubles caused by alternate immersion in salt water and quick drying after taking-off.

A NEAT ENGINE-MOUNTING.

The Comper Swift was described in THE AEROPLANE for Jan. 15. In that description mention was made of the Comper Vibration-Absorbing Unit.

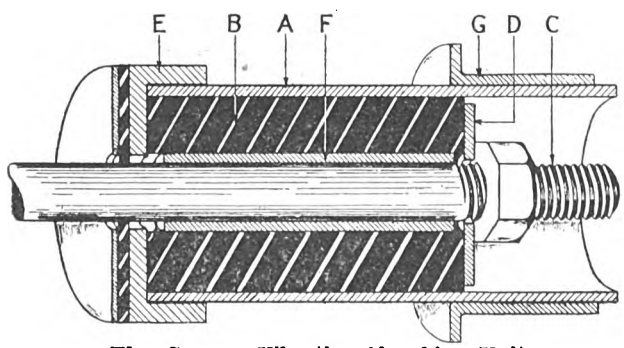
This gadget has been devised to isolate the engine-mounting and fuselage from engine-vibration.

The effectiveness of this has been demonstrated over a long period in the C.L.A.4, which has already been mentioned as the flying test-bed of the Comper Aircraft Co. Ltd. The engine of this machine is a twin-cylinder horizontally-opposed job.

Each unit has a steel cylinder (A) in which is a cylindrical block of rubber (B). The engine-bearer bolts or studs (C) pass through the middle of the rubber, compression of which is obtained by screwing up the engine-bolt nuts to the steel washer (D).

This washer is of less diameter than the internal diameter of the outer case (A) so that there is no metallic contact between the bearer bolts (C) and the outer case (A) because at the engine end of the unit the bolts (C) pass through an oversize hole in the cap (E).

There is a sleeve (F) through which the bearer-bolts pass. This tube is a distance-piece. When the engine is fitted the nuts are tightened until this tube is in compression. Then the nuts are slackened off a turn to ensure that there is no contact other than through the rubber between the engine and the unit.



The Comper Vibration-Absorbing Unit.

These units are mounted on the engine-bearers by straps or clips. The thrust is taken by the flanged sleeve (G) which is rivetted or bolted to the outer case (A).

A patent-application for this unit has been filed. People who are interested in this ingenious method of damping vibration should apply to the Comper Aircraft Co. Ltd., Hooton Park Aerodrome, Wirrall, Cheshire.

A CUTTY SARK FOR AUSTRALIA.

Matthews Aviation Co., of Essendon, Melbourne, is planning to start a service between Melbourne and Launceston, Tasmania, across the Bass Strait. The route to be followed will be by way of Wilson's Promontory and the group of islands in Bass Strait, including Flinders Island.

For this service the Matthews Aviation Co. has ordered a Saunders-Roe Cutty Sark amphibian (two Cirrus III engines). This machine is now doing its final trials at Cowes before being shipped to Australia.

SUPER BALLOON TYRES.

The Goodyear Tyre and Rubber Co., of Akron, Ohio, has made experiments with the new Goodyear Air-Wheel in a deflated condition.

With a standard three-seat biplane fitted with two 22 x 10 Air-Wheels, one of which was deliberately cut through the casing and fabric and tube with a five-inch cut, the Goodyear test pilot made a long series of landings and take-offs from rough ground. On taking-off the tyre assumed its natural balloon-like shape and on landing at no time did the machine show as great a tendency to swerve round as is common with deflated high-pressure tyres.

The Goodyear Co. states that in landing with a high-pressure tyre the side stress frequently results in complete collapse of the wheel but with the Air-Wheel, the tyre takes the greater share of the strain and serves as a cushion. In addition the hub provides a rolling contact with the ground regardless of the condition of the Air-Wheel.

Every effort was made to strip the Air-Wheel from its hub but so far this has not been done.

Wind-tunnel tests have shown that Air-Wheels produce less drag than the ordinary tyres and wheels which they replace. Tests in the Wright Field wind-tunnel show that a 30 x 5 tyre and faired wheel produces 33⅓ per cent. more drag than the 22 x 10 Air-Wheel which replaces the 30 x 5 high-pressure size.

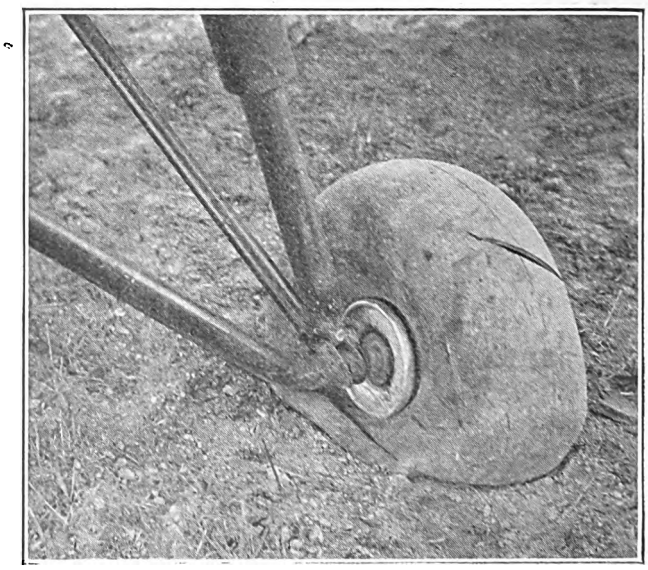
The table which appears below gives the sizes and the load-inflation of the new Goodyear "Air-Wheel," which has now been produced in eight different sizes.

All figures are for static loads in lbs. and those in italics are the maximum recommended loads.

If the wheels are inflated in accordance with the table the impact load may be computed as from 3 to 3½ times the normal load-figures given below.

Inflation Pressure	AIRWHEEL SIZE.							
	12×5-3	16×7-3	22×10-1	30×13-6	37×16-8	46×20-10	55×20-15	72×30-18
10	300	500	900	1,8'0	3.000	4,500		
15	400	700	1,200	2,400	4,000	6 000		
20	*500*	*900*	*1,600*	*3,000*	*5,000*	*7,500*	*11,000*	17,000
25	600	1,100	2,000	3,600	6,000	9,000		

[NOTE.—The third figure in the wheel size is that of the hub.]



A Goodyear Air-Wheel which was deliberately cut and thereafter fully tested in a deflated condition.

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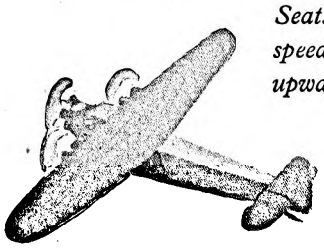
AFRICA AND AUSTRALIA COME AGAIN!

For the second time, we are able announce the receipt of orders from Australian National Airways Ltd., of Australia, and Wilson Airways Ltd., of Kenya, for the Avro 10 and the Avro 5 respectively. These repeat orders are the deliberate endorsement by experienced operators of an original choice. They provide, in the most practical manner possible, still further proof that the Avro 5 and the Avro 10 commercial aeroplanes have no rival in the world, in their particular classes, for safe and economical transport by air.

AVRO·5

Seats pilot and four passengers. Cruising speed 95 m.p.h. Range from 400 miles upward. Pay load up to 980 lbs.



AVRO·10

Seats two pilots and eight passengers. Cruising speed 100 m.p.h. Range from 400 miles upward. Pay load up to 2,400 lbs.

Particulars of these and other models may be obtained from A. V. ROE & CO., LIMITED 166 PICCADILLY, LONDON, W.1 *Works:* Newton Heath, Manchester & Hamble, Southampton *Messrs. Henlys* (1928) *Ltd.*, 385 *Euston Road, N.W.*1 *are sole concessionaires for the "Avian."*

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(Continued from page 164.)

affairs was to convince the public and the newspapers. The Government, at any rate the Government to which he had the honour to belong, was always intelligent, and needed no convincing. He would not make rash promises, but the Air Ministry was always ready to help those who helped themselves. He reminded us that the Empire was not built by men who wanted subsidies from public funds with which to pay fat dividends. They were men who came with practical propositions and got what they wanted. The Aircraft Operating Co. had started in the right spirit and it would have help as far as was humanly possible.

MR. H. BURROUGHES of the Gloster Co., proposing the health of Mr. Montague, apologised for the absence of Mr. David Longden, who was ill. He said that he had been struck at the Show by Mr. Montague's interest in Commercial Aviation, when he had only just taken office, and we were to be congratulated on the work he had done since then. Mr. Montague's ability had already been a great service to flying.

Air survey was a strong weapon in the hands of anybody with a far-sighted policy. When the Aircraft Operating Co. came to them to build the machine their specification showed that they obviously knew their job. The Gloster Co. had been inundated by propositions for all sorts of machines from all parts of the World, but the Aircraft Operating Co. knew what they wanted and were very easy to work with. He said that what this country needed was a parallel to the Mercantile Marine, that was to say aircraft operators and owners who knew the type of craft they wanted. The more buyers knew their own needs the better for the Aircraft Industry. He hoped that the Survey machine would only be a preliminary to many more.

MR. MONTAGUE said that he believed in keeping his head in the clouds and his feet on the earth. After his experience to-day in the Gloster machine he offered heartfelt congratulations to the makers. It was worthy of their splendid record, and was high testimony to the foresight of Mr. Longden and Mr. Burroughes who after building racing machines had turned to a specialised type of commercial craft. The machine was certainly not suitable for ordinary air transport over developed country because of its high cost of operating. But for its own work it was revolutionary and of high political importance.

Flying in it he had been surprised at the range of view. A machine of that sort had uses other than survey. Governors and other administrators could fly safely over great areas which they could never hope to see in the ordinary way of their duties, and prospectors and explorers could use such a machine where nothing else would do. The Gloster Co. and the Aircraft Operating Co. had thus made a considerable contribution to Civil Aviation. As an idealist he felt that Civil Aviation would do much to promote kindly feeling among peoples and would make for international peace, which could not be achieved without touching all sections of humanity.

SIR EDWARD CROWE, Comptroller of that unusually efficient establishment, the Department of Ovearseas Trade, proposing Commercial Aviation, said that he had to deal with all sorts of trades, and that his Department thought that it was much easier to bring employment to this country by developing new trades than by bolstering up old ones. There were very bright prospects in aviation. We had the finest aeroplanes and pilots in the World, and what we wanted was to let the World know what we were doing. In this country we were constantly crying pessimism. The country was not down and out, it was still doing fine trade, and in Civil Aviation it was going to lead the World. [Which is precisely what THE AEROPLANE has always said, only the quicker we do it the more money we shall make.—C. G. G.]

Referring to the survey work of the Aircraft Operating Co. in Rio, he said that it had helped British trade more than anything else in that area. His friend, the late Ambassador there, Sir Beilby Alston, seeing how things were going in air surveying, said that he wanted Mr. Hemming to go out and see for himself, so he (Sir Edward Crowe) had telephoned to his old friend Hemming and Hemming had gone at once. Sir Edward asked how many business heads of firms in this country do go to see things for themselves on the spot, and said that generally they sent juniors. [The Aircraft Industry has rather a good record in this respect. When one considers the journeys of Mr. Robert Blackburn to South America and to Greece, and the various trips by Mr. Fairey and Mr. Handley Page and Mr. Siddeley and Sir Robert McLean and Mr. North and Mr. Fedden to the United States and Canada, there certainly ought to be enough knowledge in the Aircraft Industry to put it in the right way of getting business.—C. G. G.]

Sir Edward said that such was the spirit needed. The Americans and the French and the Germans had a strong footing in South America, but we could still get the lead. Civil Aviation was fortunate in having Sir Sefton Brancker. He and Sir Sefton had been at school together, and, he said, "Brancker was an incredibly objectionable small boy,—not to the other boys but to the masters." He remembered one of them saying "Bwancker, you always make me fly into a wage," so even in those days the present Director of Civil Aviation was making people fly.

Personally when he looked at Sir Sefton and other people who had taken to flying, and then looked on those who did not fly, he had come to the conclusion that flying was the best possible aid to preserving youth. In fact he might put it that air survey showed the wrinkles on the face of the World, but flying took away wrinkles from the faces of the World.

SIR SEFTON BRANCKER replying, said that Sir Edward Crowe's Department was a great help to Civil Aviation. [Personally one would like to endorse this remark. The D.O.T. is not only one of the most useful in this country, but it is extraordinarily quick in its operation, and seems to be pervaded by a singularly high order of intelligence.—C. G. G.]

Continuing, Sir Sefton said that the Aircraft Operating Co. was one of the few firms that paid its own way. Efficiency always paid. Our air transport services were nearer paying than those of any other country.

Personally he thought that the Gloster Survey machine was wasted on air survey. It would make an ideal air yacht for anybody who could afford it. And he learned that there was a second machine of the type at the Gloster Works ready to be bought off the hook by anybody.

After lunch Mr. Saint gave various further demonstrations with the machine, taking with him in the front seat Major Cochran Patrick, who will be flying the machine in Africa. Mr. Alan Butler, who himself intends to fly the machine out to Africa within the next few weeks, also flew it. Both of them expressed their delight with the way the machine handles. Altogether the demonstration was highly successful.

In conclusion one may remark that in spite of the time of year and the distinctly dismal morning there was a large amount of activity at the Heston Air Park. Mr. Campbell Black was there with Major F. P. Scott testing the second of the Avro Fives for Wilson Air Lines Ltd. Mr. Black was delighted with the way the first one behaved on its way to Kenya, and the second one seems to be if anything a trifle better than the first. It is a very pretty machine, and with its three Genet Major engines has quite a surprising get-off.

There was quite a good deal of schoolwork going on. Mr. Jackaman appeared in his famous Bath-Moth and a number of private owners were in the air. Also, there was a very smart black and orange Desoutter from N.F.S. Ltd. and one of their Moths.

Considering that according to some pessimists there is no Civil Aviation in this country, Heston seemed surprisingly active. And Heston is a pleasant place, anyhow. Incidentally, the catering department deserves credit for putting on a West-End lunch for twenty or thirty people at short notice.—C. G. G.

OVERSEAS TRADE.

A few weeks ago THE AEROPLANE published a notice warning readers overseas not to be in a hurry to commit themselves to buying foreign-built aircraft till they had heard of the new types which are just being produced in this country. The latest information is that these new types are coming along very well indeed, and some of them will be out by the end of March, or at any rate in April. More distant readers of THE AEROPLANE are therefore particularly asked to write home about them without delay.

The original note on this subject has produced from an English business man on the Continent of Europe the following remarks:—

I was particularly pleased to see your warning to readers overseas, and hope sincerely that those great customers, the Overseas Dominions, to whom all at home seem to be looking at the expense of opportunities on the neighbouring Continent, will stay their hands another few months for the benefit of the British manufacturer.

Actually, there does not seem to be any tendency on the part of British manufacturers to depend on trading in the Overseas Dominions at the expense of possible business on the Continent. Also, possible buyers on the Continent are so close to England that they can always run over here and see for themselves how our latest types perform.

Therefore, if readers on the Continent will make their arrangements so as to take a trip to England somewhere in the first fortnight in April, they will probably see a good many machines which will interest them considerably.

RATIONALISING THE GERMAN INDUSTRY.

According to the Berlin correspondent of *The Times* the Luft Hansa organisation is being overhauled. Some foreign services were suspended last year, and foreign concerns were admitted to co-operation in others. The *personnel* was reduced by 27 per cent., and the types of aircraft from 21 to 11.

Attention was also directed to the numerous internal services, many of them born from municipal ambitions, which did not pay their way. The regional air companies associated with the Luft Hansa, which operate these services with State and municipal support, have now produced a scheme for the curtailment of the internal network, leaving only those services which offer a reasonable return.

A condition for the maintenance of a service, if this scheme is adopted, will be a certain traffic frequency, a minimum distance between termini, and a saving of time in relation to railway travel, which is sufficient to justify continuance.

The aircraft construction industry, in the absence of a military Air Force and of stable export markets, depends largly upon the Luft Hansa contracts. The number of firms is at present too great for the market and the Ministry of Communications has now tried to force measures of amalgamation or rationalisation.

In voting its last credit of 9,000,000 marks [£450,000] for the industry, the Reichstag stipulated that subsidies should in future go to four firms only, Junkers, Dornier, Heinkel, and Bayerische Flugzeugwerke. The Luft Hansa was also recommended to give contracts only to these firms.

This action has drawn protests from other firms, such as Rohrbach, and Focke-Wulf. The Luft Hansa is also dubious about it, as some of the excluded firms have produced successful types. For another thing, this action, in effect, places pressure upon the Luft Hansa to adopt all-metal construction, a matter in which views differ.

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THE JASK DISASTER REPORT.

The Air Ministry announces that on receipt of information concerning the accident which occurred to Imperial Airways Limited's aeroplane *City of Jerusalem* (G-EBMZ) at Jask, Persia, on Sept. 6, 1929, the Government of India deputed two officers, namely, Wing Cdr. R. H. Verney, O.B.E., Engineer Staff, R.A.F., India, and Mr. A. S. Lane, B.Sc., Inspector of Aircraft, Department of Civil Aviation, India, to proceed to the scene in order to collect all evidence available and to report thereon.

The Government of India and the Air Ministry, after duly considering the evidence so obtained and the opinions expressed in the report of these officers, have arrived at the following conclusions:—

(1) The pilot, when he started on the flight, had reasonable grounds for expecting to reach Jask before nightfall.

(2) In attempting to execute a night-landing on the aerodrome the pilot misjudged his height above the flare-path, with the result that the aircraft stalled and crashed to the ground, wrecking the undercarriage and port planes.

(3) The outbreak of fire was caused by the petrol from the damaged tanks becoming ignited by the burning wing-tip flare, the port plane having been swept back alongside the fuselage.

(4) All possible assistance was rendered to the injured by the staff of the Indo-European Telegraph Department at Jask with the limited resources at their disposal, and the highest commendation is due to them for their efforts in this respect.

(5) As the outcome of the investigation into the accident, additional precautions are being adopted. In this connection, however, it should be recorded that the wing tip-flares used on the aeroplane were of a type which is in general use by the Royal Air Force and which is still regarded as the most satisfactory form of emergency landing light.

THE CIVILIAN AIRCRAFT REGISTER.

"A Register of Civilian Aircraft," by R. L. Preston, was reviewed in THE AEROPLANE of Nov. 20, 1929. This little publication has been produced to help pilots and others to recognise the ownership of aircraft both in the air and on the ground.

Obviously as new machines are always being produced and old ones change hands, there is a tendency for such a register to become out of date. Mr. Preston has guarded against this contingency by issuing three-monthly amendments.

The first of these is now out and may be obtained from THE AEROPLANE Book Dept., Cannon House, Pilgrim Street, London, E.C.4, price 6d. post free.

AIR PHOTOGRAPHY.

[*Air Photography, Part I and II.* Air Publications 1354-1355, from THE AEROPLANE Book Department, Cannon House, Pilgrim Street, E.C.4. Part I 1s. 6d., Part II 4s. 6d., post free.]

Although these publications are intended primarily for the information and guidance of the R.A.F. personnel engaged in photographic duties, their sphere of usefulness does not end there. They contain much that is valuable for the civil air photographer whether he be a professional air surveyor or just an air traveller with a camera.

For the latter, there is a complete course of photography and really authoritative advice in the matter of plates, light filters and exposures. In addition, every conceivable form of trouble to be encountered is analysed and a remedy or precaution suggested.

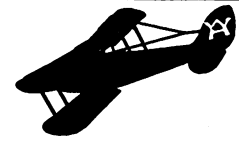
Part I deals with the objects and use of air photography and treats the subject of the flying of aircraft for successful photographic work very fully. There is a lot of space devoted to the little known art of interpreting air photographs.

Part II is the technical photographic publication. Its subject matter is based on all the years photographic experience of the R.N.A.S., R.F.C. and R.A.F. There are nearly thirty pages of formulæ, chemical and optical, which form a ready guide in such matters as heights to fly and areas covered and the choice of focal lengths of lenses, etc.

The serious air photographer will find these books of inestimable value for reference. And those who only occasionally take photographs when flying would do well to be guided by the elementary principles set out, if the results of the photographs are to be worthy of public exhibition.

With the growth of the light aeroplane movement there will be a corresponding increase in the number of air photographs taken. It is likely to prove a popular side-line to the movement and clubs and other social centres will, in time, have their own photographic sections. To prepare for this, and for the benefit of those already interested, copies of these publications should be in every club library.—C. A. S.

THE AIRWORK FLYING SCHOOL



CHIEF INSTRUCTOR: CAPT. V.H.BAKER M.C., A.F.C.
PRIVATE INSTRUCTION ON THE LATEST TYPES OF THE BEST MAKES OF LIGHT AEROPLANES FITTED WITH AUTOMATIC SLOTS & WIRELESS
THE MOST UP-TO-DATE SCHOOL IN THE WORLD
PUPILS ON EARLY SOLOS RECEIVE ADVICE FROM THEIR INSTRUCTORS BY WIRELESS

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flies faster than any other airship -

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LOST IN THE ARCTIC.

On Nov. 9, Lieut. Eielson and his mechanic, Mr. Borland, left Alaska to fly to the s.s. *Nanuk*, which was locked in the ice. They had previously rescued six persons from the ship. They never arrived and in spite of continuous searches by other aircraft no trace of them has since been found.

A report from Seattle dated Jan. 26 states that the wreckage of Lieut. Eielson's machine has been found 90 miles west of Cape North by Mr. Joe Crosson. There were no traces of the aviators, who seem to have been thrown out of the machine and thereafter buried by drifting snow. The machine is said to have been so badly smashed that they must have been killed. And the food in it was not touched.

THE ENDURANCE TEST OF R.100.

On Jan. 27 R.100 left Cardington at 9.38 a.m. for the start of what was expected to be her forty-eight-hour endurance test. The R.100 was still up on Jan. 28, while this paper was going to press, and passed over London during the morning.

She had previously flown over Oxford, down the Bristol Channel, over Plymouth, and then round Guernsey and Sark. After this the airship cruised up the Channel and was reported off Beachy Head and Dover.

MARSEILLE—LONDON IN FIVE HOURS.

On Jan. 26 a French postal aeroplane left Marignane aerodrome near Marseille at 9.05 hours. At 12.35 hours the machine was at Le Bourget. A stop of 35 minutes was made at Lyon.

At Le Bourget the mail was transferred to another machine and was flown to Croydon in one hour fifty-five minutes. This is evidence of the value of fast postal machines for speeding up mail services.

CROYDON—JUBA.

THE AEROPLANE for Jan. 22 reported the safe arrival of Messrs. Haines and Thorne in the Fairy IIIF (Armstrong Siddeley Jaguar) at Juba, in the Sudd. A few details of the trip out are now available.

The machine was held up once or twice by weather conditions. The engine and aircraft gave no trouble whatever. The route was Croydon—Paris—Marseilles—Pisa—Rome—Catania—Malta—Tunis—Tripoli—Benghazi—Cairo—Khartum—Mongala—Juba.

At Paris the machine was held up by fog for two days. At Catania (Sicily) Mr. Haines landed on a normal aerodrome. Next morning it was under water and the voyagers were detained for two or three days.

DE HAVILLAND SERVICE.

Moth owners are finding more and more that wherever they go in the World they can get service from De Havilland depots. Apart from the subsidiary De Havilland companies in Australia and in Canada, who are establishing their own stations and agents in those continents, service stations are being established in practically every other Dominion, and in most foreign countries in the World.

Some time ago complaints used to reach this paper about the difficulty and delay in getting spare parts for damaged Moths in India. Now Wing Cdr. D. F. K. Crosbie has established a depot at Karachi (Forbes Building, Dunolly Road), and is setting up branch service stations at Bombay and Calcutta, which will be in operation by the time these notes appear in print. From these three service stations Moth users in any part of India can get spares within a few days.

Recently a Moth owner in Germany complained that he could not get Moth spares in that country. Investigation showed that he had failed to go to the right place for them. As a matter of fact, Herr Friedrich, a well-known German War-time pilot, and quite one of the most energetic business men in aviation in Germany, took up the De Havilland agency some time ago and opened a full-size Moth service station actually on the Tempelhof Aerodrome, Berlin. So there is no excuse for anybody landing at Tempelhof and not knowing where they can get attention.

Apparently, on occasion, Moth owners landing at Tempelhof have taxied straight into the big workshops of the Deutsche Luft Hansa, where, the people in charge being good business men, they have been induced to commit themselves and their machines to the care of the Luft Hansa.

Nobody questions the ability of the Luft Hansa ground-engineers to do a good repair job, and obviously they have no interest in passing clients to the Moth service station, but equally obviously a big firm of that sort must charge more for housing and attendance and for minor repairs than is charged by an agent who is directly interested in the Moth. So in future Moth owners going to Tempelhof should look out for Herr Friedrich's Moth station.

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NEW N.F.S. CENTRES.

Municipal aerodromes are to be established at Nottingham and Stoke-on-Trent and agreements have been signed whereby National Flying Services will manage and equip these aerodromes as lessees under the corporations.

National Flying Services is already in occupation at the site bought by the Nottingham Corporation at Tollerton. The Nottingham Aero Club has joined the N.F.S. organisation, and it will be provided with a club-house hangar, and all the necessary equipment at the new aerodrome. The site, which covers 140 acres, is under four miles from the centre of the city.

The Stoke-on-Trent site will be equipped on the same lines as that at Nottingham. The South Staffordshire Aero Club has been formed and will operate from this aerodrome.

Negotiations are now under way for the establishment of an aerodrome and flying club at Middlesbrough.

CROYDON NOTES.

Probably the most International Aviation Firm in existence is V.L.B. Ltd., Throgmorton Street. This consists of Mr. Van Lear Black, the well-known American of Netherland descent, and probably the requisite number of British-born directors to make it an English registered Company. His machine is a Fokker, built in Holland, with American engines, with the British registration G-AADZ, and is called *The Free State of Maryland.*

Mr. Black's pilots are the well-known Netherlanders, Geysendorffer and Scholte, his engineer is an American, and a great part of his English Aviation business is conducted through an English secretary, who is as efficient as she is charming.

Finally he gets his gas (or petrol) from the Anglo-American Oil Company, whose representative, Mr. Hewlett, is naturally bi-lingual, speaking both Anglo and American with the greatest ease.

Mr. Black gave one of his delightful dinner parties last Thursday, at 5, Aldford Street, which was in the nature of a farewell party before his Tokio flight. The evening was enlivened by Mr. Will Rogers, the American humorist, who is really very funny indeed in real life, and what is more, is entirely spontaneous about it.

Sitting adjacent to him one was somewhat deranged (being ticklish by nature) by his tendency to punctuate his after-dinner speech with cow-punches to the ribs and ox-felling shoulder slaps which seemed to coincide with one's modest attempts to get a sip of brandy and which once caused one to do some clever gargling with the glowing butt of a corona-corona, a turn which also gained applause.

Mr. Black's guests received a souvenir in the shape of a magnificent pocket aneroid in a "Cartier" case with the date of the party engraved on the back, which, as most of Mr. Black's friends are flying enthusiasts, thanks to his own enthusiasm, was a particularly appropriate gift.

Who is the sporting character in Aviation circles, who learned to fly with Wilbur Wright in ought eight at Daytona Beach? Probably the same who took lessons from Montgolfier on Tooting Common, when remarkable ascents were made on the pupil's hot air capacity. Motgolfier's bus flew on hot air, you will remember.

Mr. "Jock" Anderson is in a dazed condition, because of the Air Ministry's juggling with his log-book. Many moons ago, he sent both log-book and licence to the Ministry and in due course his licence came back in an envelope which exactly fitted it. Air Ministry, when approached, swore the log-book had been enclosed with the licence but eventually had to admit they had sent it to Switzerland to a gentleman whose name also began with A. He finding it comparatively useless on the Cresta Run, politely returned it and Jock got it just in time to prevent him from knocking on the door of Adastral House with a stick of dynamite.

A correspondent, who was in the R.A.F. and who has now gone into the glove-manufacturing business, is anxious to design the perfect flying glove and wants suggestions from pilots. A glove of the R.A.F. pattern made of leather, not fur on the outside on account of oil, and having separate fingers and a snap back finger muff as well, if lined with the warmest fleece or whatnot available, and made thoroughly waterproof, seems hard to beat.

If commercial pilots will whisper suggestions (but not ribald ones) in Spry's ear, they will be passed on to the glove manufacturer.—SPRY.

THE LONDON TERMINAL AERODROME.

ANALYSIS OF FIGURES FOR PAST WEEK.

Trips per Day.—Sunday, 7; Monday, 12; Tuesday, 14; Wednesday, 15; Thursday, 14; Friday, 20; Saturday, 17.

IMPERIAL AIRWAYS LTD.:
London—Egypt—India: London—Le Touquet—Paris—Basle—Zurich: London—Ostend—Brussels—Cologne and return: Machines 35, passengers 175, freight 11 tons. India Route: Inward, passengers 0, mail 433 lbs.: outward, passengers 0, mail 730 lbs.

AIR UNION:
Paris—London: Machines 32, passengers 110, freight 8 tons.

K.L.M.:
Amsterdam—Rotterdam—London: Machines 10, passengers 18, freight 4½ tons.

SABENA:
Brussels—London: Machines 12, passengers 12, freight 2¼ tons.

DEUTSCHE LUFT HANSA A.G.:
Amsterdam—London: Machines 7, passengers 5, freight 1 ton.

MISCELLANEOUS:
British machines 3, passengers 4.
Foreign machines 0, passengers 0.
Total number of trips by British machines, 38, carrying 179 passengers. Foreign machines, 61, carrying 145 passengers.

COMPARATIVE FIGURES.

Week ending Jan. 25:
Machines, 99; Passengers, 324; Crews, 255; Total personnel, 579.
Corresponding week, 1929:
Machines, 68; Passengers, 245; Crews, 134; Total personnel, 379.
Corresponding week, 1928:
Machines, 95; Passengers, 314; Crews, 174; Total personnel, 488.
Corresponding week, 1927:
Machines, 53; Passengers, 122; Crews, 87; Total personnel, 209.
Corresponding week, 1926:
Machines, 58; Passengers, 119; Crews, 74; Total personnel, 193.
Corresponding week, 1925:
Machines, 47; Passengers, 97; Crews, 62; Total personnel, 159.
Corresponding week, 1924:
Machines, 58; Passengers, 112; Crews, 89; Total personnel, 201.
Corresponding week, 1923:
Machines, 29; Passengers, 52; Crews, 61; Total personnel, 113.
Corresponding week, 1922:
Machines, 22; Passengers, 42; Crews, 33; Total personnel, 75.
Corresponding week, 1921:
Machines, 13; Passengers, 8; Crews, 14; Total personnel, 22.

GLIDING ENTHUSIASTS.

On Jan. 19 Mr. Lowe Wylde of Rochester and five other gliding enthusiasts started work on a glider and made trestles and a sixteen-foot lay-out table.

On Jan. 20 they began on the design of a training glider. They have been working hard ever since on week-day evenings and week-ends. They have a carefully planned production-chart which aims at completion by Feb. 8. This will make a 20 days' job of it.

At present the club has completed both built-up spars for the main-plane. The tailplane is half assembled. The rudders and both elevators are finished.

This is a very bright effort and the partnership, or conspiracy, or whatnots, are to be congratulated on practising what they have preached. They feel strongly about the alleged need of German instruction, and this is to demonstrate that we can design, build and fly our own gliders.

A NEW GLIDING CLUB.

On Jan. 9 a meeting was held in Nottingham at which twelve persons were present. As a result the Model Aircraft Construction Society was formed and decided on a nominal subscription of 10s. per annum. Mr. F. A. Lowe is Hon. Secretary. Anyone seeking admission to the Society as a member must be introduced by an existing member and put up for election.

The aims and objects of this Society will be the study of Aviation principles in the least expensive way. The meeting unanimously agreed that its activities would include a full-scale glider, the "Linnet," a normal type of biplane.

THE AEROPLANE is indebted to the *S.M.A.E. Journal* for this information.

BOOK EARLY.

On Feb. 19 at 18.30 hrs., as reported in THE AEROPLANE for Jan. 22, Dr. Georgii will lecture before the Royal Aeronautical Society on gliding. The Royal Aeronautical Society announces that admission will be by ticket only and that application for tickets should be made as early as possible.

Tickets may be obtained from The Secretary, The Royal Aeronautical Society, 7, Albemarle Street, W.1.

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THE EVOLUTION OF METAL AIRCRAFT

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El sistema de construcción en duraluminio Vickers ha sido adoptado en el nuevo tipo de aparatos comerciales y militares en curso de estudio.

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THE ROYAL AIR FORCE.

The London Gazette.

Air Ministry, January 21.

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—G. ap Silyn-Roberts is granted a perm. comn. as a Plt. Off. with effect from Jan. 11, and with seniority of Jan. 11, 1929; J. K. Brew is granted a S.S. comn. as a Plt. Off. on probation with effect from and with seniority of Jan. 4.

The following Plt. Offs. are promoted to the rank of Flg. Off.:—T. W. G. Eady, E. Rotherham (Nov. 25, 1929); R. E. Watts (with seniority of Nov. 25, 1929) (Nov. 27, 1929); A. K. H. Binley, F. C. E. Hayter, J. C. L. Claxton, H. E. Sales, D. L. Iremonger (Dec. 29, 1929).

Wing Cdr. O. T. Boyd, O.B.E., M.C., A.F.C., ceases to be seconded for duty at the Staff College, Camberley (Jan. 1); Wing Cdr. T. L. Leigh-Mallory, D.S.O., is seconded for two years' duty at the Staff College, Camberley (Jan. 1); Sq. Ldr. H. Dawes, M.B.E., is placed on the retired list (Jan. 22).

The following Flg. Offs. are transferred to the Reserve (Jan. 17):—CLASS A.—R. L. Burnett, D. S. Green, N. K. Howard, C. P. Vines. CLASS C.—R. D. Adams, J. C. Noel. Flg. Off. E. Addis relinquishes his S.S. comn. on account of ill-health (Jan. 17).

The S.S. comns. of the following Plt. Offs. on probation are terminated on cessation of duty:—G. W. Stranraer-Mull (Jan. 9); R. J. B. Hitchin-Kemp, H. Travis (Jan. 21).

STORES BRANCH.—The following are granted perm. comns. as Plt. Offs. on probation with effect from and with seniority of Jan. 10:—F. C. Read, W. A. Lee, L. Llewellyn, E. N. Lowe, J. W. C. Revill, G. C. Allen, B. S. Cartmel.

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—The following Plt. Offs. are promoted to the rank of Flg. Off.:—P. F. England, W. W. L. Jones, G. H. Newberry (Jan. 2); G. Nelson (Jan. 3); J. W. Carmichael (Jan. 9); M. J. R. Alderson, H. T. Edgecombe, D. R. Gray, G. J. E. Howard (Jan. 10); S. R. Herringshaw (Jan. 11); T. H. W. Beadle, F. C. Fisher, F. G. Hill, N. F. Marsh (Jan. 16); J. F. Legard (Jan. 17).

Flg. Off. J. E. Preston is transferred from Class C to Class A (Jan. 3).

Wing Cdr. J. P. C. Sewell, O.B.E., relinquishes his comn. on completion of service, and is permitted to retain his rank (Dec. 5, 1929); Flg. Off. D. H. Geeson relinquishes his comn. on completion of service (Jan. 15); Plt. Off. on probation J. K. Brew relinquishes his comn. in the Special Reserve on appointment to a S.S. comn. in the R.A.F. (Jan. 4).

MEDICAL BRANCH.—Flt. Lt. F. T. Boucher resigns his comn. on appointment to a comn. in the Royal Army Medical Corps (July 10, 1929).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 603 (CITY OF EDINBURGH) (BOMBER) SQUADRON.—The following Plt. Off. to be Flg. Off.:—A. H. Bruce (Dec. 9, 1929).

Appointments.

Week ending January 27.

GENERAL DUTIES BRANCH.—Air Vice-Marshal H. C. T. Dowding, C.B., C.M.G., to H.Q., Fighting Area, Uxbridge, 4/1, on appointment as Air Officer Commanding.

Air Commodore The Hon. J. D. Boyle, C.B.E., D.S.O., to H.Q., A.D.G.B., Uxbridge, 10/1, for duty as Chief Staff Officer.

Group Captains E. L. Gossage, D.S.O., M.C., to Special Duty List, 15/1, on appointment as Air Attaché at Berlin vice Group Captain M. G. Christie, C.M.G., D.S.O., M.C. E. M. Murray, D.S.O., M.C., to R.A.F. Depot, Uxbridge, 21/1, supernumerary.

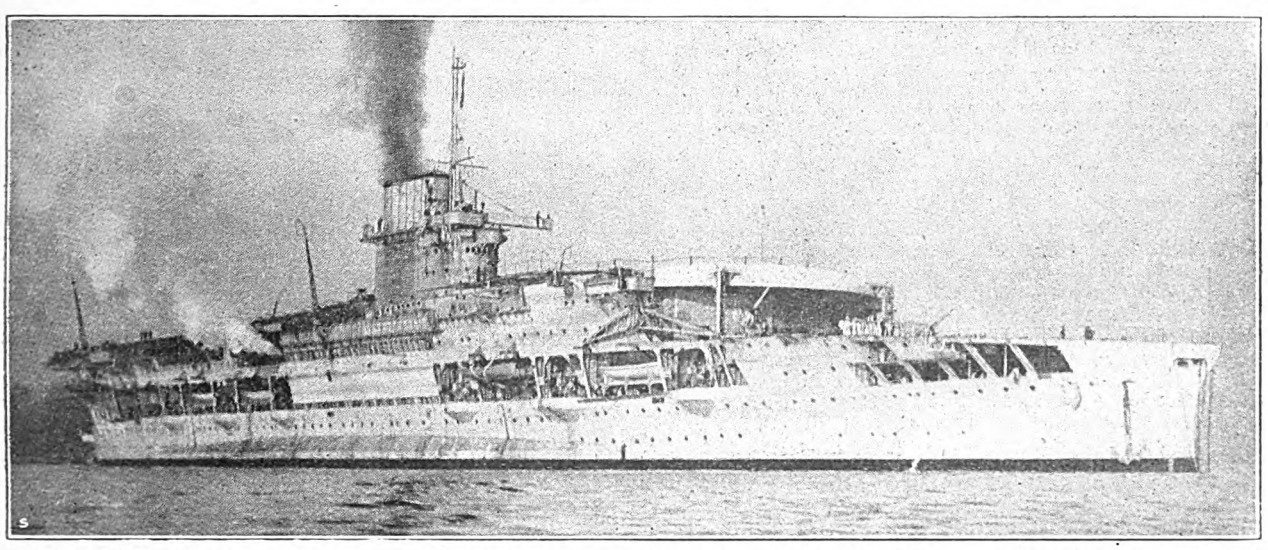
Wing Commanders B. L. Huskisson, D.S.C., to H.M.S. *Glorious*, 7/1, for duty as Senior R.A.F. Officer in H.M.S. *Glorious* (on commissioning). L. T. N. Gould, M.C., to R.A.F. Depot, Uxbridge, 3/1, supernumerary. G. R. M. Reid, D.S.O., M.C., to R.A.F. Staff College, Andover, 29/12, supernumerary. O. T. Boyd, O.B.E., M.C., A.F.C., to Air Ministry (Dept. of C.A.S.) (D.O.S.D.), 4/1, on appointment as Deputy Director of Staff Duties vice Group Captain E. L. Gossage, D.S.O., M.C. J. C. M. Lowe, to H.Q., Inland Area, 20/1, for Air Staff (Armament) Duties). A. A. B. Thomson, M.C., A.F.C., to Air Ministry (Dept. of A.M.S.R.), 20/1, on appointment as Asst. Director (Armament). R. P. Willock, to R.A.F. Depot, Uxbridge, 22/1. R. D. Oxland, O.B.E., to R.A.F. Depot, Uxbridge, 22/1. P. C. Sherren, M.C., to R.A.F. Depot, Uxbridge, 20/1. R. Graham, D.S.O., D.S.C., D.F.C., to R.A.F. Station, Kenley, 1/1, to command.

Squadron Leaders G. C. Pirie, M.C., D.F.C., to R.A.F. Staff College, Andover, 1/1. D. F. Stevenson, D.S.O., M.C., to R.A.F. Depot, Uxbridge, 6/1. R. G. Gardner, D.S.C., to Air Ministry (Dept. of A.M.P. (D.P.S.)), 6/1. W. A. C. Morgan, M.C., to No. 10 Sqdn., Upper Heyford, 30/12. G. G. Dawson, to R.A.F. Staff College, Andover, 29/12. M. L. Taylor, A.F.C., to School of Photography, S. Farnborough, 11/12. A. N. Gallehawk, A.F.C., to H.Q., Inland Area, 28/12. E. G. Hopcraft, D.S.C., to R.A.F. Depot, Uxbridge, 29/12. G. C. Rhodes, to No. 2 F.T.S., Digby, 23/11. H. W. Woollett, D.S.O., M.C., to No. 23 Sqdn., Kenley, 15/1. H. H. MacL. Fraser, to R.A.F. Staff College, Andover, 20/1. W. R. Cox, M.C., A.F.C., to R.A.F. Staff College, Andover, 20/1. R. S. Lucy, A.F.C., to No. 10 Group H.Q., Lee-on-Solent, 14/1. G. E. Godsave, to R.A.F. Depot, Uxbridge, 15/1. E. F. Turner, A.F.C., to No. 201 Sqdn., Southampton, 17/1.

Flight Lieutenants W. H. Jinman, M.B.E., to No. 209 Sqdn., Mount Batten, 15/1. E. S. Burns, to R.A.F. Staff College, Andover, 25/12. J. D. Breakey, D.F.C., to No. 205 Sqdn., Singapore, 7/1. R. D. McE. Hart, to No. 205 Sqdn., Singapore, 7/1. L. G. Nixon, to C.F.S., Wittering, 27/11. H. Stafford, to Station H.Q., Upper Heyford, 15/12. J. Oliver, A.F.C., to No. 3 Sqdn., Upavon, 6/1. J. L. Kirby, to Station H.Q., Hendon, 5/1. J. L. Airey, D.F.C., to School of Photography, S. Farnborough, 1/1. H. F. Jenkins, to No. 1 Sqdn., Tangmere, 11/1. R. P. P. Pope, D.F.C., to Home Aircraft Depot, Henlow, 1/1. J. M. Glaisher, D.F.C., to No. 10 Sqdn., Upper Heyford, 16/1. D. A. Boyle, to R.A.F. College, Cranwell, 16/1. O. R. Gayford, D.F.C., C. F. Horsley, M.C., G. Martyn, C. R. Davidson, M.C., H. D. O'Neill, A.F.C., E. I. Bussell, G. M. Bryer, O.B.E., A.F.C., A. B. Ellwood, D.S.C., S. D. Culley, D.S.O., J. W. Baker, M.C., D.F.C., D. d'H. Humphreys, G. M. Knocker, A. P. Davidson, and C. A. Bouchier, D.F.C., all to R.A.F. Staff College, Andover, 20/1. R. E. Meek, to R.A.F. Depot, Uxbridge, 20/1. C. C. Bazell, to H.M.S. *Furious*, 20/1. N. A. P. Pritchett, to Base, Gosport, 12/1. A. H. Paull, to Air Ministry (Dept. of A.M.P.), 20/1. R. S. Bruce, M.B.E., to No. 1 F.T.S., Netheravon, 20/1.

Flying Officers T. P. P. F. Fagan, to H.M.S. *Glorious*, 7/1. G. E. G. Leywood, to H.M.S. *Glorious*, 7/1. L. C. Barling, to C.F.S., Wittering, 28/12. W. E. Barnes, to Supt. of R.A.F. Reserve, Hendon, 22/12. C. McK. Grierson, to No. 205 Sqdn., Singapore, 7/1. J. W. Smith, to No. 2 Armoured Car Co., Middle East, 10/1. G. K. Horner, to Aircraft Depot, India, 19/11. P. J. H. Halahan, to R.A.F. Depot, Uxbridge, 10/12. C. S. John, to No. 33 Sqdn., Eastchurch, 13/1. J. H. McN. Campbell, to R.A.F. Base, Calshot, 14/1. L. W. W. Modley, to 445 Flight, Mediterranean, 7/1. A. D. Jaffe, to 460 Flight, Mediterranean, 7/1. D. J. Stewart, to R.A.F. Base, Gosport, 1/1.

Pilot Officers C. Ryley, to No. 209 Sqdn., Mount Batten, 15/1. On appointment to a Perm. Comn. from the R.A.F. College, the undermentioned Pilot Officers are posted as stated below:—A. Earle, to No. 100 Sqdn., Bicester, 14/12. G. R. A. Elsmie, to No. 43 Sqdn., Tangmere, 14/12. F. F. Wicks, to No. 2 Sqdn., Manston, 14/12. J. Heber Percy, to No. 43 Sqdn., Tangmere, 14/12. R. L. Wallace, to No. 17 Sqdn., Upavon, 14/12. E. S. Dru Drury, to No. 3 Sqdn., Upavon, 14/12. W. Sawyer, to No. 41 Sqdn., Northolt, 14/12. B. A. Fraser, to R.A.F. Base, Calshot, 14/12. W. H. Kyle, to No. 17 Sqdn., Upavon, 14/12. W. N. McKechnie, to R.A.F. Base, Calshot, 14/12. P. Heath, to No. 25 Sqdn., Hawkinge, 14/12. A. G. Tiedeman, to No. 111 Sqdn., Hornchurch, 14/12. G. F. W. Heycock, to No. 111 Sqdn., Hornchurch, 14/12. L. W. C. Bower, to No. 100 Sqdn., Bicester, 14/12. R. V. McIntyre, to No. 19 Sqdn., Duxford, 14/12. B. H. Jones,



EXPLICIT NOMEN.—H.M.S. "Glorious," the latest British aircraft-carrier, which completed to full crew at Devonport on Jan. 24. The Senior R.A.F. Officer in H.M.S. "Glorious" is Wing Cdr. B. L. Huskisson, D.S.C.

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to No. 29 Sqdn., North Weald, 14/12. J. Grierson, to No. 12 Sqdn., Andover, 14/12. J. Y. Humphreys, to No. 2 Sqdn., Manston, 14/12. E. F. J. L'Estrange, to No. 4 Sqdn., S. Farnborough, 14/12. J. K. Brew, to No. 99 Sqdn., Upper Heyford, 4/1, on appointment to a SS. Comn. (on probation). A. ap Silyn-Roberts, to No. 2 F.T.S., Digby, 11/1, on appointment to a Perm. Comn. J. D. H. Slade, to Base, Gosport, 12/1. The undermentioned Pilot Officers are posted to No. 2 F.T.S., Digby, with effect from 11/1:—C. E. Alven, D. J. Alvey, W. B. Bailey, J. Bamber, E. V. N. Bramley, R. A. Byrne, M. G. C. Chadwick, H. F. Chester, A. R. T. Coke, C. W. W. S. Conway, L. E. Dalrymple, E. Elgey, C. J. Farrell, E. M. Gurney, G. J. Holland, D. Holt, L. W. V. Jennens, A. W. R. Lawson, R. P. J. Leborgne, N. S. Lesmere, D. W. Lucke, R. A. McMurtrie, R. J. R. H. Makgill, W. R. Ottewill, W. C. Pitts, W. T. Ratcliffe, B. P. Reynolds, H. W. Riley, A. C. Sant, L. E. B. Stonhill, M. F. Summers, W. B. Thompson, G. R. White, R. B. Whittingham, A. R. Wilson, F. Woodward, H. M. Chubb, with effect from 15/1.

MEDICAL BRANCH.—Wing Commander P. M. Keane, D.P.H., to H.Q., 'Iraq Command, 11/1, for duty as Deputy Principal Medical Officer.

Squadron Leaders T. J. X. Canton, M.B., to No. 10 Group H.Q., Lee-on-Solent, 11/1. T. Montgomery, M.D., D.P.H., B.A., to H.Q., Aden Command, 16/11.

Flight Lieutenants R. Boog-Watson, M.B., D.P.H., to R.A.F. General Hospital, 'Iraq Command, 7/12. F. L. White, to H.Q., R.A.F., Middle East, 10/1. J. C. Neely, B.A., to R.A.F. General Hospital, 'Iraq Command, 7/12. G. H. J. Williams, to H.Q., R.A.F., Middle East, 3/1. D. A. Wilson, to R.A.F. General Hospital, 'Iraq Command, 7/12. S. A. McCormack (Dental), to R.A.F. Depot, Uxbridge, 22/12.

Flying Officers P. J. McNally, M.B., to R.A.F. General Hospital, 'Iraq Command, 7/12. C. G. Harold, M.B., to H.Q., R.A.F., 'Iraq Command, 3/1. A. Sheehan, M.B., to H.Q., R.A.F., 'Iraq Command, 3/1. C. C. Fenton, M.B., B.S., B.Sc., to R.A.F. Depot, Uxbridge, 13/1. M. J. Piggott (Dental), to R.A.F. Depot, Uxbridge, 9/1, on appointment to a Temp. Comn.

STORES BRANCH.—Group Captain W. R. Bruce, O.B.E., to Air Ministry (Dept. of A.M.S.R.) (D. of E.), 1/1, for Stores Staff duties.

Wing Commander W. Millett, to No. 4 Stores Depot, Ruislip, 6/1, to Command.

Squadron Leader F. G. M. Williams, to R.A.F. Staff College, Andover, 20/1.

Flight Lieutenants K. D. G. Collier, to H.M.S. *Glorious*, 7/1. S. D. Dennis, to R.A.F. Base, Kai-Tak, 7/1. R. D. G. Macrostie, M.B.E., to No. 4 Stores Depot, Ruislip, 15/12. H. B. S. Ballantyne, to R.A.F. Depot, Uxbridge, 22/12. W. Bourne, to No. 1 Stores Depot, Kidbrooke, 10/1. T. G. Bowler, to R.A.F. Staff College, Andover, 20/1.

Flying Officer M. H. Jenks, to Station H.Q., Andover, 1/10.

Pilot Officers:—The undermentioned Pilot Officers are posted to H.Q., R.A.F., Cranwell, on appointment to Perm. Comns. (on probation) with effect from 10/1: F. C. Read, W. A. Lee, L. Llewellyn, E. N. Lowe, J. W. C. Revill, G. C. Allen, B. S. Cartmel.

ACCOUNTANTS BRANCH.—Flight Lieutenants H. G. Bushell, to Station H.Q., Andover, 14/1. G. N. Simon, to A.A.E.E., Martlesham Heath, 10/1. E. W. Horncastle, to Station H.Q., Hendon, 9/1. G. Goodall, to H.Q., R.A.F., Cranwell, 31/12.

Flying Officer H. A. Frost, to No. 1 Stores Depot, Kidbrooke, 30/12.

CHAPLAINS BRANCH.—The Rev. C. A. Smith, to Station H.Q., Upavon, 6/1. The Rev. S. H. Keen, to R.A.F. Record Office, Ruislip, 7/1, for duty as Staff Chaplain (Wesleyan). The Rev. F. D. Morley, to H.Q., R.A.F., Halton, 7/1, for duty as Chaplain (Wesleyan) on appointment to a S.S. Comn.

A Fatal Accident.

The Air Ministry regrets to announce that as the result of an accident near Sudbury, Suffolk, to a Fairey machine of No. 207 (Bomber) Squadron, Bircham Newton, on Jan. 21, Flg. Off. Donald Mackenzie, the pilot of the aircraft, and No. 361666 Cpl. Leonard Edward Barnard were killed.

The Long Range Monoplane Accident.

The following statement was issued by the Air Ministry on Jan. 21:—

The evidence gained by the Air Ministry officials who went out to investigate the loss of the Long Distance Monoplane at Tunis, shows conclusively that there was no failure of the engine or aircraft. It is also certain from the log-book, which has been recovered, that the occupants had kept exactly on their course and knew their position.

The cause of the disaster is believed to have been that owing to some unexplained circumstances which may include a failure of the aneroid, the pilot had reason to think that the aircraft was several hundred feet higher than it in fact was. There was a severe local storm in the area where the machine crashed and it is believed that the pilot only saw the hill at the last moment and that in the endeavour to clear it, the machine lost flying speed and dived into the ground just over the brow, an additional factor being possibly the down-draught caused by the prevailing wind.

The Army Senior Officers' School.

The following officer of the R.A.F. is among those who have joined the Army Senior Officers' School at Sheerness for the 32nd course:—Wing Cdr. P. C. Sherren, M.C.

Vacancies for Apprentice Clerks.

The Air Ministry announces that 60 vacancies exist in the R.A.F. for well-educated boys, between the ages of 15½ and 17, to enter as apprentice clerks. Thirty vacancies will be filled in April and 30 in July. Some of the posts will be filled by means of an open competition which will be held by the Civil Service Commission in April at various centres (for entry in July, 1930) and the remainder by direct entry of boys who have obtained an approved school certificate. Successful candidates will be required to complete, in addition to the training period, 12 years' Regular Air Force service after reaching the age of 18. At the age of 30 they may return to civil life or may be permitted to re-engage to complete time for pension.

Boys entered under this scheme undergo a two years' course of training in clerical duties, typewriting, shorthand, bookkeeping and practical office routine, during which time their general education is continued under a staff of graduate teachers.

The apprentice clerks are paid 1s. a day for the first year and 1s. 6d. a day afterwards. The subsequent *commencing* rates of pay, varying from 3s. to 4s. 6d. a day (21s. to 31s. 6d. a week), depend upon the degree of success they achieve at their final examination. In addition, they receive free board and lodging.

Detailed information regarding the apprentice clerk scheme can be obtained from the R.A.F. (Apprentice Clerks' Department), Gwydyr House, Whitehall, S.W.1.

The R.A.F. Staff College.

The following officers of the Dominion Air Forces have been selected to undergo the 8th Course at the R.A.F. Staff College, beginning in January, 1930:—

Royal Australian Air Force: Flt. Lt. F. M. Bladin, Flt. Lt. D. E. L. Wilson.

Royal Canadian Air Force: Sq. Ldr. C. McEwen, M.C., D.F.C., Flt. Lt. G. R. Howsam, M.C.

The R.A.F. in India.

In the House of Commons on Jan. 21, Major Pole asked the Secretary of State for India the amount contributed in each of the last five years by the Government of India to the Air Ministry on account of recruitment and training of personnel of "the Royal Air Service," and the total cost to Indian revenues in each of these years of transport charges and direct expenditure on pay and maintenance of the R.A.F. Units in India.

Mr. Benn gave the following figures, which are those of the Budget Estimates:—

Year. (1)	Total cost of R.A.F. to Indian Revenues. (2)	Payment to Air Ministry in respect of recruitment and training. (3)	Cost of sea transport. (4)	Charges other than (3) and (4), including pay and maintenance, i.e. column (2) minus columns (3) and (4). (5)
	Rs.	Rs.	Rs.	Rs.
1925-26 ..	1,87,29,000	10,00,000	1,60,000	1,75,69,000
1926-27 ..	1,79,02,000	10,00,000	2,50,000	1,66,52,000
1927-28 ..	1,85,15,000	10,00,000	2,50,000	1,72,65,000
1928-29 ..	2,26,50,000	13,33,000	4,66,660	2,08,50,340
1929-30 ..	9,38,00,000	14,40,000	3,67,000	2,19,93,000

An Indian Air Force.

In the House of Commons on January 23 Major Pole asked the Secretary of State for India whether, in view of the fact that Indian Cadets who passed through Cranwell would not be allowed to enter the R.A.F., the Government had before them proposals for the creation of an Indian Air Force; if so, whether he would inform the House as to the constitution of the proposed force; and whether it was intended that this force should take over the functions performed now by the units of the R.A.F. stationed in India.

Mr. Benn said that the creation of an Indian Air Force formed part of the accepted policy of Indianisation, and was already under consideration. Matters had not yet advanced far enough to enable him to give any details as to the constitution or future functions of such a force.

Low Flying.

Sentence was promulgated on Jan. 21 in the case of Flg. Off. V. H. Nicolay, No. 4 (A.C.) Sqdn., who was charged at a court-martial at Farnborough on Jan. 9 with flying too low over thickly populated parts of Southampton and of performing aerobatics over an infants' school. He was ordered to be severely reprimanded and deprived of his seniority.

Parachutes for Sea-Going Aircraft.

In the House of Commons on January 22, in reply to a question by Capt. H. Balfour, the Under-Secretary of State for Air said that the provision of parachutes for the crews of aircraft when flying over the sea was regarded as a matter of great importance, but a difficult mechanical problem was involved, namely to devise a form of parachute harness enabling the wearer to divest himself of encumbrances in a confined space in the least possible time if his machine fell into the water.

Exhaustive trials and experiments extending over more than four years had been carried out with forms of quick release to enable the wearer to get rid of his parachute equipment. He was hopeful that the latest design of quick release would be adequate for sea-going aircraft other than those flying on and off ships' decks, and that one of the types of equipment recently under trial in the Fleet, although not fulfilling all the desired conditions, would be found sufficiently satisfactory for these latter aircraft. If this was confirmed provision would be made as early as possible.

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The Royal Australian Air Force.

Flt. Lts. F. M. Bladin and D. E. L. Wilson, R.A.A.F., sailed for England in November 1929 in R.M.S. *Orford*, to attend the R.A.F. Staff College, Andover. On conclusion of the course they will be attached to R.A.F. units for one year, returning to Australia in 1931.

Rugby Football.

R.A.F. versus Cambridge University:—The R.A.F. were beaten by Cambridge University at Cambridge on Jan. 22 by three goals, three tries and a penalty goal (27 points) to three goals (15 points). The Air Force were without Flt. Lt. Beamish.

Cambridge kicked off and shortly afterwards the Air Force forced a scrum down in front of the Cambridge goal. An attempt to clear by a kick sent the ball to White who fielded it neatly and went over almost untackled. Llewellyn converted. Shortly afterwards the Air Force forwards got the ball in the loose and nearly scored, but a penalisation for off-side gave Cambridge a chance to relieve the pressure. At this stage the Air Force appeared to be doing most of the work and Cambridge most of the shouting.

After 15 minutes' play Cambridge improved rapidly and they crossed the Air Force line twice in quick succession, Carris converting one try and failing with the other. Soon they put themselves further ahead with a penalty goal. The Air Force three-quarters were bunching badly and their runs were therefore cramped and easily dealt with by the Cambridge men, but in spite of that Pott went over far out and Llewellyn's kicking was exceptionally good. Cambridge replied with an unconverted try.

In the second half the Cambridge threequarters made some movements. This combined with the inability of the Service forwards to get the ball in the scrum prevented the Air Force from having their full share of the game. Cambridge made good use of their speed and sureness in handling and secured two tries in quick succession, the second being converted. The R.A.F. then went all out and Llewellyn narrowly missed dropping a goal.

Later White nearly scored with a good run and apparently only a momentary hesitation prevented him from doing so. The Air Force were now pressing and a fine individual run through by Odbert gave Llewellyn another try to convert. Shortly before the final whistle Carris scored a final try for Cambridge which he converted.—C. C.

The R.A.F. team were:—Plt. Off. Nicholson; Flg. Off. Cotton, Plt. Off. Llewellyn, Flg. Off. Pott, Flg. Off. White; Flt. Lt. Odbert, Plt. Off. Elsmie; L-AC. Robinson, Plt. Off. Letchworth, Sjt. Kerby, Plt. Off. Constantine, Flt. Lt. Franks, Sjt. Hall, L-AC. Maxwell, Flt. Lt. Tattersall.

R.A.F. versus Northampton:—The R.A.F. were beaten by Northampton at Northampton on Jan. 25 by two placed goals, two dropped goals and a try (21 points) to one placed goal and two tries (11 points). Northampton showed marked superiority forward. The R.A.F. tries were scored by Hodder, Pott and Llewellyn.

The Rugby Cup Competition.

The results of the second round ties in the R.A.F. Inter-Unit Cup Competition are as follows:—

Northern Section:—Donibristle (H) beat Leuchars (3 points to nil).

Midland Section:—Sealand (H) beat Digby (29 points to nil); Henlow (H) beat Felixstowe (48 points to nil).

S.E. Section:—Ruislip and Manston drew (replay on 5.2.30); Eastchurch beat Northold (H) (19 points to nil).

S.W. Section:—Gosport (H) beat Lee-on-Solent (22 points to nil); Andover beat Worthy Down (H) (16 points to 6).

THE STRATEGICAL MOBILITY OF AIR FORCES.

A lecture on the Strategical Mobility of Air Forces was given at the Royal United Service Institution on Jan. 22 by Group Captain C. L. Courtney, C.B.E., D.S.O., R.A.F.

Air Marshal Sir John Higgins, K.C.B., K.B.E., D.S.O., A.F.C., Air Member for Supply and Research, was in the Chair.

Group Captain Courtney said that although the subject of his lecture was one which had been neglected in public utterances it was of paramount importance to the Royal Air Force.

[But, to give honour where it is due, this is a quality of air force, to which Sir Samuel Hoare has made many references in public though nobody outside the Services has made it the subject of an address.—ED.]

At the end of the War 1914 the extent of the mobility of aircraft had been speed. Outside their radius of action aircraft had been less mobile than infantry. But to-day mobility was not only a matter of high speed but also distance. His definition of Strategical Mobility was the ability to move over long distances at high speed and to operate effectively on reaching the destination.

Mobility was needed to enable the air force to concentrate at the right time in the right place and for economy in defence. Reliability and independence were needed equally with range and speed.

Resources must be developed to enable a sufficient force to operate as and where necessity arose. National economy would not allow of air force units being stationed at all points where they might be needed.

The Lecturer quoted from a report made to the Carnarvon Committee in 1882, which read:—"No addition to the number and power of Your Majesty's ships will make up for lack of coaling stations . . . ."

REQUIREMENTS.

The first mobility requirement of an air force was that supplied by organised air routes. By organised air routes he meant routes which had landing grounds or anchorages suitably spaced throughout the route with refuelling facilities and wireless and meteorological organisation.

The second essential requirement was reliability of aircraft and engines.

The third was aircraft endurance.

With regard to the mobility of the Royal Air Force a very large part of the Empire could be reached by all-red routes. By increasing the endurance of aircraft they could be enabled to skirt round foreign countries. This question of endurance was a good answer to those who queried the value of non-stop flights. Recent long-distance flights had been made of over 4,000 and 5,000 miles and, as a well-known British aircraft constructor had stated recently, no two places in the World were more than 12,000 miles apart. What was possible to-day in specially designed aeroplanes and with specially prepared landing grounds might very well be a natural thing in ten or fifteen years' time.

The fourth mobility requirement was means of immediate maintenance. The British commercial routes now in existence had been originally organised by the Royal Air Force but under the requirements of Imperial Airways they had been improved, with stopping places equipped as repair depots. Wireless and meteorological services warned operating aircraft of weather conditions. The commercial air routes therefore provided the organisation to enable Service aircraft to operate in emergency away from their bases.

Reliability was partly a matter of the higher training of the personnel.

Aircraft operating away from their base required a system of supply of fuel, stores, ammunition, spares and rations. This supply must be maintained by air, it was useless to depend on overland transport or shipping for supplies. Heavy air transport machines could be used.

ESTABLISHED ROUTES.

The present position was that we had an established air route from Egypt to India. It had been developed by the R.A.F. and adopted by Imperial Airways. It was well equipped with re-fuelling stations, wireless and meteorological services and, since Imperial Airways took it over, with rest-houses. An alternative route was being developed along the north coast of Arabia. There were repair depots at Baghdad, Karachi, and in Egypt.

A party was now reconnoitring for landing grounds along the south Arabian coast with the result that we should soon be able to send aircraft from 'Iraq to Aden direct.

The route from Karachi to Delhi was fully organised and Imperial Airways would be extending their operations as far as Delhi immediately and as far as Calcutta in a few months. India lent itself particularly well to a number of feeder lines. These were even now being operated by the R.A.F. in the course of visiting military formations and co-operating with them.

The section of the route between Calcutta and Singapore made forced landings there difficult and dangerous and at the same time the conditions during the monsoon period made forced landings practically inevitable. Therefore landing grounds at closer intervals than on any other part of the route were necessary.

This section would probably be operated with sea-going aircraft. Aerodrome construction had gone hand in hand with provision for seaplanes (or flying-boats). The coastline between Calcutta and Singapore was ideal for seaplanes. The numerous inlets and islands offered plenty of natural sheltered anchorages. The same applied to the part between Singapore and Australia.

With regard to the African route all the aerodromes had been selected and in the Summer of this year Imperial Airways would start their weekly service as far as Kenya, and next year they would have a weekly service to the Cape.

The Lecturer reminded his audience that aerodromes alone did not constitute an air route. Petrol, oil, water, and rest-houses followed the adoption of a route for civil purposes, which amenities could not be afforded merely for Service contingencies.

EXAMPLES OF RELIABILITY

With regard to reliability, criticism had been levelled at aircraft that they were uncertain and dependent on wind and weather. He did not propose to quote the achievements of the civil air lines. They might be compared with the operations of the cross-Channel boats of which it had been said that their commanders could take them into harbour blindfold. He would, instead, point to certain Service exercises.

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Each year for the past five years a Flight of Service aircraft had flown to the Cape and back. This was a normal Service exercise, and if a day was lost on the outward journey it was made up on the homeward journey and each year the flight had been completed according to schedule.

The trip had originally taken three months but now it took little more than six weeks. No attempt was made to break records. The exercise included training with the local military forces on the route. Its object was to accustom Units to flying long distances without outside assistance.

Every other year, beginning in 1925, a flight had been made to Nigeria and back,—the last time it had extended to the Gold Coast. Plenty of time was allowed for co-operation with the West African Frontier Force. The flights had always ended on time and had been successful although not without incident. They invariably met sandstorms, thunderstorms and even tornadoes. Not only were these flights valuable from the point of view of training but they were also valuable as showing the Flag in parts of the Empire which were otherwise nearly inaccessible.

Between Calcutta and Singapore the R.A.F. flying-boat squadron at Singapore had made a number of successful flights during the monsoon period. This period was accompanied by low cloud, low visibility and a rainfall of 20 inches in a month (the total rainfall of a year in England).

In June they had flown from Singapore to Rangoon and back, a distance of 2,800 miles, through some severe storms, in 17 days.

In August they had flown from Singapore, *via* Rangoon to Calcutta and back in 15 days, a distance of 4,300 miles. During the 21 hours' flying on the return journey from Calcutta to Victoria Point they had never flown above 800 feet.

In September they had flown to Calcutta and back in 15 days. A fractured airscrew had delayed them two days on the outward journey, which delay had been made up on the homeward journey.

In October the north-west monsoon changed to a south-west monsoon which made the conditions a little easier. On every trip they had adhered to their time-table.

Flying-boats could be relied upon to get through the most difficult conditions with reasonable regularity. All this went to show that when it was necessary to effect concentration aircraft would get there at a speed unobtainable in any other form of transport.

A striking example of the reliability of Service aircraft had been the now well-known evacuation of nationals from Kabul. What was less well-known was the fact that reinforcements had been sent from 'Iraq in two days and that these machines had been replaced by machines from Egypt in one day.

The heavy transport aircraft which had effected most of the evacuations from Kabul had operated continually for ten days away from their base and had been maintained by their crews with only a small quantity of spares. As there were no sheds big enough for them they had been refuelled and maintained out in the open.

An interesting point in connection with these operations was that Sir Francis Humphreys, who had recently taken up his appointment as High Commissioner for 'Iraq, had travelled from Cairo to Baghdad in the same machine and with the same pilot as had effected his evacuation from Kabul some months previously.

RANGE OF AIRCRAFT.

With the present range of aircraft machines could be flown from England to Gibraltar, from Gibraltar to Malta, and from Malta to Egypt, in three hops without intermediate stops for re-fuelling. Even single-engined bombers had a range of 600 miles with full military load, which range could be extended, with extra petrol instead of bombs, to 1,000 miles. The heavy multi-engined machines had a range of 1,500 miles without overloading.

[This will be greatly increased when the new all-metal machines with lighter engines come into service.—ED.]

Long-distance non-stop flying was not practical in Service units, partly because up to the present there had been no accurate petrol gauge. But now there was a new invention known as the flow-meter, and the lecturer added that he would like to see a trophy instituted to encourage long-distance flying among Service units.

MAINTENANCE.

Units of the Royal Air Force frequently moved at short notice between stations in Egypt, Palestine, and 'Iraq, as and when occasion required concentration of forces. This was not enough. The R.A.F. ought to be able to put aircraft down where no aircraft had been stationed before. The question was mainly one of maintenance.

He thought it was fair to assume that the base of operations would not be entirely devoid of communication by land or sea. There would be no need to send the whole of the personnel of a squadron of twelve aeroplanes by air. About 50 men would do for a few weeks. Nor would all the stores, about 15 to 20 tons, be necessary. Essential stores would be 2 or 3 tons. The rest, with the majority of the personnel, could be sent by ordinary methods. Five heavy transport machines could accompany the squadron to its base.

The daily requirements of a squadron in fuel, explosives and rations, up to about four tons, could also be maintained by heavy transport aircraft from the nearest available source. One of these machines could carry one and a quarter tons for 600 or 700 miles. Six heavy transport aircraft could maintain supplies for a squadron over 1,200 miles.

The general tendency to-day was towards making aircraft easier to maintain and towards training the men more carefully. An example of the maintenance and operation of a squadron had occurred in Southern 'Iraq in the winter of 1927-8. One and a half squadrons of aeroplanes had operated between 60 and 80 miles from a railhead. Five tons of supplies a day had been needed and during the operations 450 tons had been sent forward by air.

SUMMARY.

Summarising, Group Captain Courtney said that the strategical mobility of air forces required: (1) Organised air routes, (2) Reliability in flying over these routes in all weathers, (3) Increased endurance of aircraft, and (4) The development of means of maintenance by the construction of heavy transport aircraft to carry essential needs.

THE DISCUSSION.

REAR-ADMIRAL E. A. ASTLEY-RUSHTON, C.B., C.M.G., R.N., asked what was the distance between landing grounds on air routes and what was the fuel saving between maximum speed and economical speed, he believed that an aeroplane required fuel for 2,000 miles to ensure its getting 1,000 miles.

Group Captain Courtney said that the distance apart of landing grounds varied according to topography. Generally speaking in India and 'Iraq an aeroplane could land practically anywhere and the landing grounds were between 300 and 350 miles apart. In some places they were only 200 miles apart. With regard to economical speed, roughly a machine needed to carry 20 per cent. more fuel than was needed for the distance along the route, provided one had reasonably good ground organisation.

Replying to a further remark by Rear-Admiral Astley-Rushton, he said that it was quite true that England was cut off from all her Empire air routes by the whole Continent of Europe, but one way of avoiding this was to organise a route by way of Gibraltar and Malta and the other was to have adequate reserves in Egypt. The problem of making an aerodrome at Gibraltar was, he believed, not so much a matter of finding a ground, as of encroaching on the recreation grounds.

CAPTAIN WEBB (The Manchester Regiment) said that the R.A.F.'s success at Kabul had been due to the strategical position of the R.A.F. in India and asked whether the Royal Air Force could take over a country like Burma. Group Captain Courtney said that he did not know Burma, but he believed that aerodromes could be made anywhere.

Another member of the R.U.S.I. called attention to the China Coast, and Group Captain Courtney said that the section of the route from Calcutta to Singapore could easily have a feeder route to North Borneo and then possibly to Hong Kong. He thought that the China Coast should not be neglected.

AIR MARSHAL SIR JOHN HIGGINS, proposing a vote of thanks, said that the Lecturer had been very conservative in his estimate of the range of present day aircraft. We had any number of flying-boats with a range of 1,500 sea miles without re-fuelling, and a boat was now being built which could fly to Malta without re-fuelling or touching anywhere. We had general purpose machines in 'Iraq and the Middle East which, with extra fuel tanks, could fly 5,000 actual miles. Troop carriers were being built which would do 1,000 miles with useful load. No one who had seen the aerodrome at Singapore and knew what the land was like before, could doubt our ability to make an aerodrome anywhere.

Seconding the vote of thanks, a Naval Officer said that he hoped the R.A.F. would get its Bases, as apparently they alone would soon be expected to defend the Empire. He also hoped that having given them the Bases the Treasury would not say "Now you won't want any aircraft."—C. M. MCA.

AN APPOINTMENT.

The Air Ministry announces that the Rt. Hon. Lord Thomson, P.C., C.B.E., D.S.O., Secretary of State for Air, has appointed Mr. I. V. H. Campbell to be his Assistant Private Secretary in place of Mr. P. J. Oldfield, promoted.

PALESTINE'S NEW AIRPORT.

The buying of 500 acres of land for civil aerodrome is the most recent move in the development of Haifa, the new port of Palestine, which (writes a correspondent) is destined to become one of the most prominent ports of the Levant.

Final arrangements have not yet been made, but Haifa is expected to become a link in the air route to India, and will in due course cut out a great part of the Mediterranean crossing.

The whole of the present aerodrome site was a malarial swamp on the banks of the Biblical river Kishon. Part of this has been drained under the Government reclamation scheme, and another large area by Jewish colonisers.

Regular readers of THE AEROPLANE will remember that six or seven years ago this paper stated that Haifa, or Jaffa, was some day to become our great oil port, with a pipe-line across the desert to the oil-fields of 'Iraq.

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PERSONAL NOTICES.

DEATHS.

BARNARD.—On Jan. 21, near Sudbury, Suffolk, as the result of a flying accident, Cpl. Leonard Edward Barnard, R.A.F.

EVANS.—On Jan. 21, at Heliopolis, Egypt, Flg. Off. C. H. L. Evans, R.A.F., dearly loved elder son of the Rev. W. M. L. and Mary Evans, Saxby Rectory, Brigg, aged 23 years.

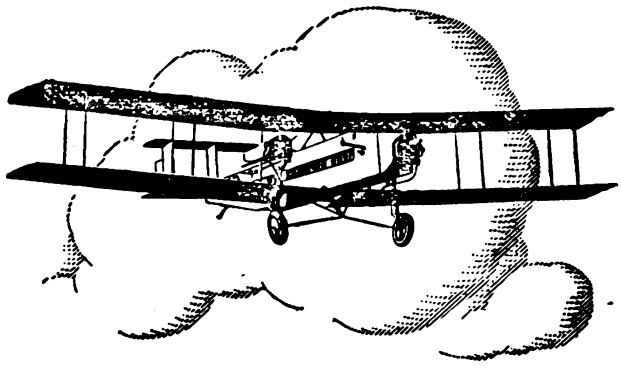
Mr. Evans entered the R.A.F. with a short-service commission in January, 1926, and, after a course of flying training at No. 2 F.T.S., Digby, was posted to No. 16 (Army Co-operation) Squadron, Old Sarum. He was promoted to Flying Officer in July, 1927, and posted to No. 6 (Army Co-operation) Squadron, Mosul in September, 1927.

MACKENZIE.—On Jan. 21, near Sudbury, Suffolk, as the result of a flying accident, Donald Mackenzie, Flg. Off., R.A.F., son of Sheriff A. O. M. Mackenzie, 10, Grosvenor Crescent, Glasgow.

Mr. Mackenzie entered the Royal Air Force with a short-service commission in January, 1926, and, after a course of flying training instruction at No. 2 F.T.S., Digby, was posted to No. 207 (Bomber) Squadron. He had passed a course in Armament and Gunnery.

MARRIAGE.

MANNING—DEGENHARDT.—On Jan. 25, in the Chapel of the North Sydney Grammar School, N.S. Wales, Wing Cdr. Edye Rolleston Manning, D.S.O., M.C., R.A.F., son of the late William Alexander Manning, of Sydney, and of Mrs. Manning, at Dawson Hotel, London, W.2, to Phyllis Mary Louise, only daughter of Mr. and Mrs. C. A. Degenhardt, of Killara, N.S. Wales.



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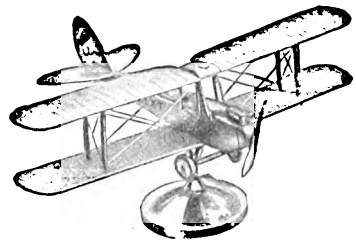

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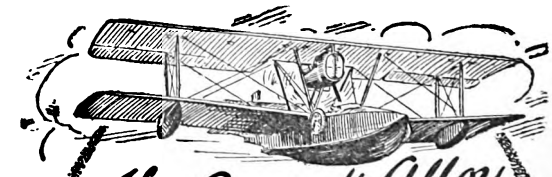

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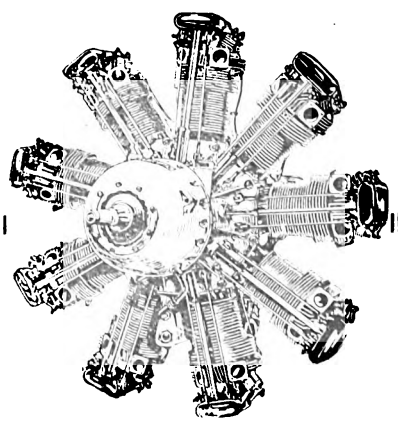

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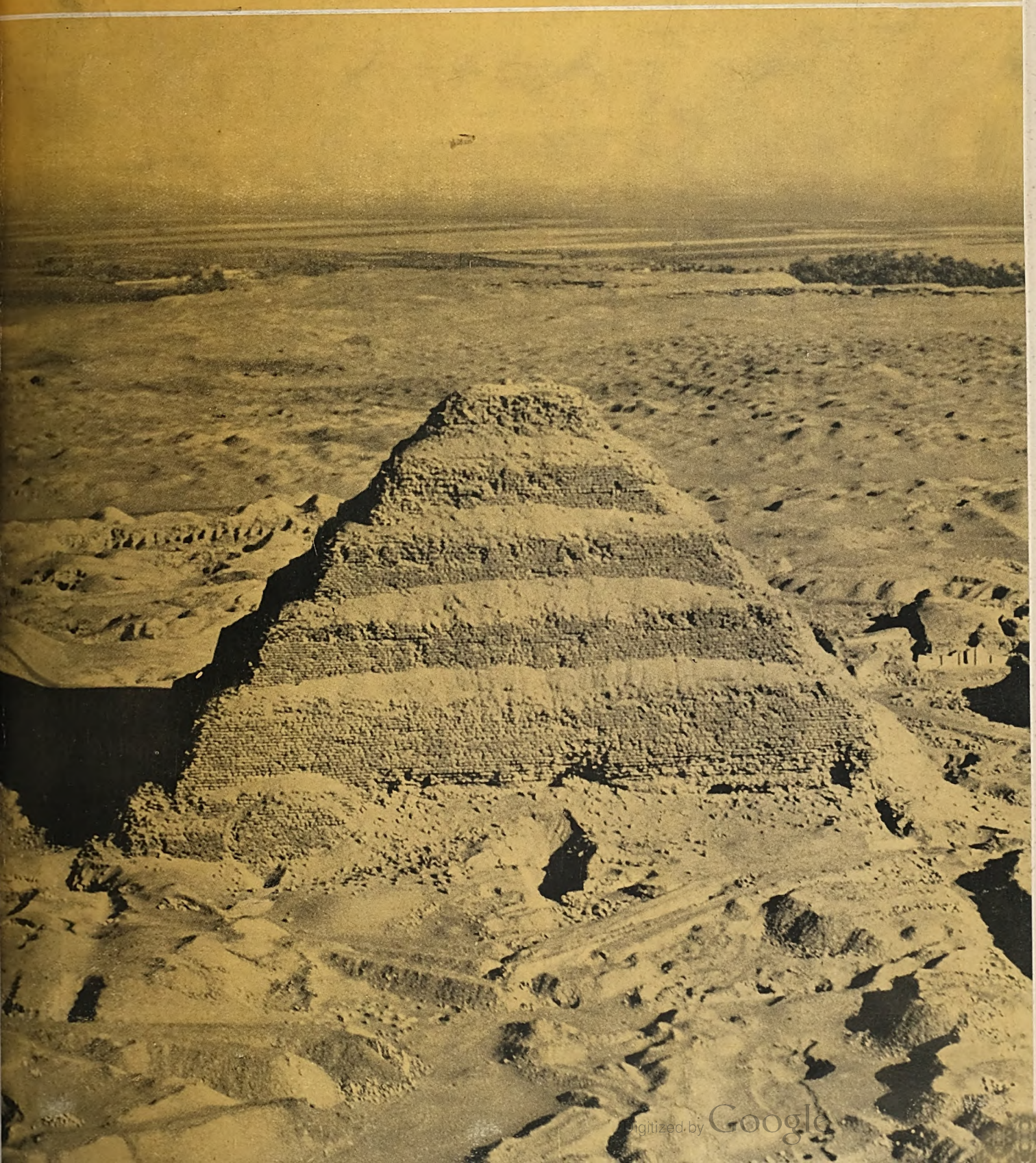
THE AEROPLANE

6d. Weekly.

INCORPORATING AERONAUTICAL ENGINEERING

Edited by C.G.Grey



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Fortunately for all of us who are concerned with British Aviation the British Trade Boom looks like coinciding with the development of air transport on a scale which in itself would have caused something like a boom in aviation, even if there had been no general Trade Boom to back it. With a general growth of commerce to help it, the result should be all the more satisfactory for Commercial Aviation.

Preparing the Way.

Naturally the question which most interests us at the moment is what particular form our trade crusade should take. Already the aircraft markets of all nations have been quite well prepared for British Aircraft. Besides selling quite a respectable quantity of British aircraft and parts we have done a large amount of useful ground-baiting,—as fishermen call it. And The Aeroplane, which seems to be read by the Chiefs of all foreign nations, has been consistently telling the World that our aircraft are the best.

We have had representatives of various aircraft firms in every country in the World. General Festing and Mr. Gerald Deane between them have covered pretty well every part of South America. Mr. Blackburn himself has also been to South America. The Bristol Aeroplane Co. and Vickers Ltd. are well represented in Chile, and already good business is being done there. The Fairey Aviation Co. and Vickers have sold war-machines in Chile. Vickers have sold war-machines and training machines to Bolivia. Fairey machines have been sold to Argentina. The Chilean Government have bought De Havilland Moths quite largely for training and Moths are being used in Argentina and Brazil.

Wherever British Aircraft has been used in South America they have increased the confidence of the buyers in the high quality of our products. And now that we are preparing to compete with America and Germany and France in offering commercial transport machines to foreign countries, our task should be all the lighter.

On the Continent of Europe wherever British aircraft or engines have gone, or wherever they have been bought for use by Continental countries, they have upheld the reputation of British manufactured goods, and so there also the way has been prepared for us.

In the British Dominions there is no need for us to convince buyers of the quality of British aircraft. All we have to do is to supply machines which are suitable for the particular jobs for which the inhabitants want to use aircraft.

In the Far East aircraft have hardly been used at all as yet. The Air Survey Co. Ltd., which has lately been acquired by the Fairey Aviation Co. Ltd., has done a large amount of survey work in Burmah and Borneo and in the Straits Settlements. And in Rhodesia the Aircraft Operating Co. Ltd. has done surveys on a large scale. In all those parts the people have been educated up to understand the uses of aircraft. Therefore, comparatively little more education will be needed to teach them to use air transport just as at present they use sea transport, seeing that there is so little road or rail transport available.

China is still in a condition which is too chaotic to make regular trade possible, but in spite of that quite a considerable number of aeroplanes of various types and built in several different countries, have been bought by various Chinese leaders.

Taking it all round, therefore, the necessary ground-work of air transport has already been done practically all over the World. What is now needed is continued and intensive demonstration to show people that, first, air transport is a commercial proposition, and secondly, that we in Great Britain can provide better air transport vehicles than can any other Nation.

A Co-operative Raid.

Some few months ago in The Aeroplane, Mr. Gerald Deane published an interesting letter on the desirability of co-operation between some, or if possible all, of the firms in the Aircraft Industry in forming a kind of squadron of British aircraft of various types, built by various makers, which should tour the whole of South America, and, later, other parts of the World, demonstrating our aircraft of different makes, and canvassing for orders for them. The idea is naturally not new, but the suggestion came at an opportune moment. So far nothing definite has been done, but one gathers that there is quite a possibility of several firms co-operating in such a raid on foreign business.

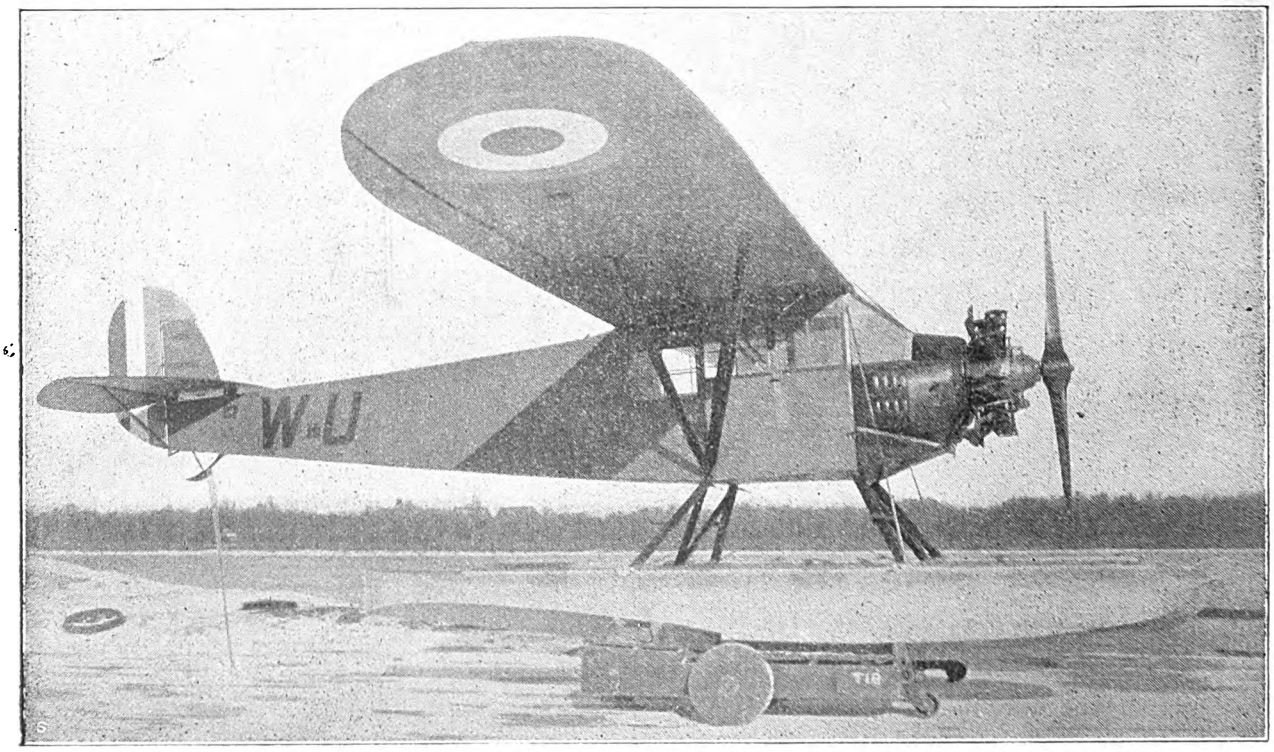
Naturally such a wholesale invasion of foreign countries would be very expensive. But in the end the result would be worth the money spent. The greatest difficulty is the reconciling of the rival interests of the co-operating firms.

Possibly even a better suggestion would be a raid on foreign markets by a well-financed commercial concern which was not itself interested in any one manufacturer, but simply took up for this particular journey the agencies of certain makers, and reconciled the rival interests of those makers in its own interests as a money-making concern.

Something of this kind is apparently being done in the motor trade. The Rootes Brothers announced some months ago that they were sending out a motor trade mission to practically all countries in the World to push the sale of the cars built by certain British manufacturers who had laid themselves out to produce types peculiarly suited for overseas markets. Perhaps something of this kind could be done with aircraft if financiers could be found to put up the comparatively large amount of money needed for such a venture.

A General Crusader.

An interesting Trade Crusade proposition is that which is at present being organised by that inventive genius, Mr. Pemberton Billing. His Parliamentary crusade in 1916 for more and better aircraft for our Flying Services certainly did much to remedy a crying evil, and even those Service people who disapproved of his methods recognised that his aims were praiseworthy and that his agitation played a necessary part in the campaign which ended a year later by our holding the Command of the Air in all War areas.



LYNX-ENGINED.—A Fairchild F.C.2 cabin monoplane with a geared Armstrong Siddeley Lynx engine belonging to the Royal Canadian Air Force.

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Probably most of the heads of firms in the Aircraft industry have by now received the book which Mr. Billing has produced to introduce his Trade Crusade to British manufacturers of all kinds of goods. Briefly the idea is that he has bought a steamer of goodly size, and is turning the whole downstairs part of the ship into a mass of shop windows.

Each shop window is to be let to a business firm which wishes to sell its goods abroad. In that window are displayed samples of the firm's goods and in front of the window is a kind of counter, inside which are gramophone records in French, Spanish, German, and English, describing the goods in the window. To each gramophone is connected a head-phone, and visitors to the ship seeing anything they like in a shop window merely pick up the head-phones, press the button, and are told in their own language all about the goods in the window.

According to the present scheme the ship will be visiting a hundred ports in all parts of the world in the course of the next two years. That will be at an average of one week per port. Allowing for the journeys in between ports, the stay at each port will probably be about three or four days. When the ship approaches a given port, the commercial manager on board will have all the gramophone records changed to the language spoken in that port. And literature describing the goods in the ship, and describing the purpose of the ship itself, will be distributed to all the local merchants as soon as the ship comes into port.

The more important merchants and the officials of the port will be invited on board to lunch and will be shown round the ship. After that the ship will be thrown open to all and sundry, by ticket. There will be interpreters on board who will previously have been primed with information about all the various firms represented. And the ship when it starts will, in fact, act as a kind of enormous collective commercial traveller for all sorts of British goods.

The most astonishing thing about the scheme is how cheaply it works out for each individual participant. A shop window about the size of the window of an ordinary small tobacco shop costs £1 per week. Thus for the price of an office-boy a firm may have its goods shown to the most important buyers of a hundred of the World's most important sea-ports. And naturally firms who would like to pay more can have a bigger display.

One of the interesting ideas embodied in the scheme is that if any firm likes to pay a little extra it can have installed alongside its shop window, a cinematograph machine where visitors can see a display of the firm's goods in motion. The film may display the firm's work-shops in action or, as with aircraft, it may display the firm's product in action. In any case the firm has quite a simple and cheap way of getting its products known practically all over the world.

Without suggesting that Mr. Billing's ship, *The British Trade Crusader*, as he calls her, can be in any way an effective substitute for a combined attack on foreign business by actual aeroplanes and pilots, it does strike one as being quite a cheap and useful form of advertisement for aircraft firms who are out to cultivate foreign business, and it might be well worth while as a sort of agent in advance for a bigger campaign.

A shop window moving from port to port, full of models and photographs of a firm's machines or engines or aircraft accessories, accompanied by a cinematograph display of the firm's products, would do quite a good deal to stir up interest before the arrival of an accredited representative of the firm accompanied by a complete aeroplane and crew.

Also the enquiries received on board the ship as the result of such a display might well indicate to manufacturers just how and in what direction they had better make their attack on the markets overseas.

Anybody in the Aircraft Industry who is interested in the proposition can spend a very entertaining half-hour at the office of The British Trade Crusade Ltd., 28, Cockspur Street, S.W.1, having the whole scheme of the ship explained. There are sample windows, already displaying British goods whose manufacturers are taking part in the crusade, and there are the cinematographs, and the gramophones which Mr. Billing ingeniously calls proxyphones, seeing that they do the duty of the firms' salesmen. They are all there to be inspected by anybody who is interested.

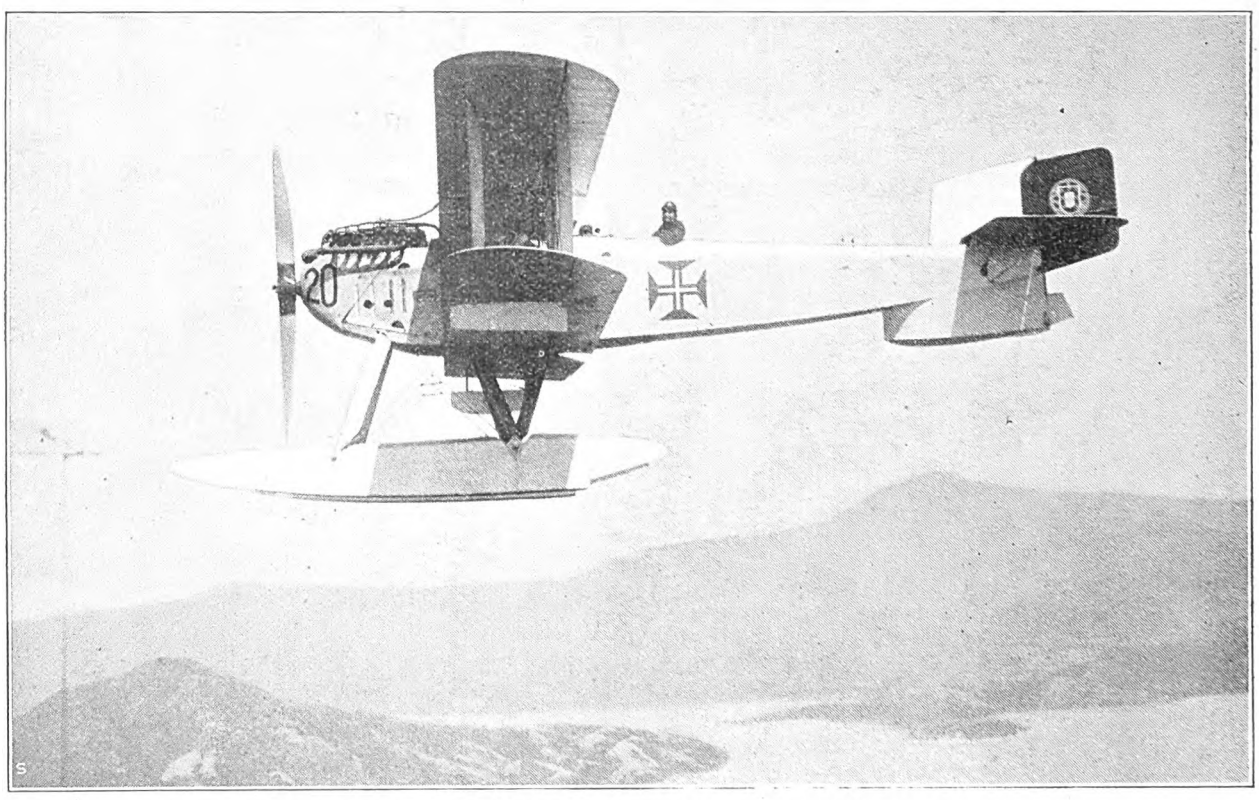
As Mr. Billing himself puts it, either the scheme is a gold mine or a gold brick, and unless a firm goes in for it to a most elaborate extent, the outlay need only be very little. The real money which *The British Trade Crusader* will make will only come as a percentage of the sales effected through its cruise.

One does not suppose that if an aircraft firm took an interest and made a display it would sell whole fleets of aircraft to some foreign nation, although even more unlikely things have happened. But the scheme does strike one as being a cheap and effective way of presenting to foreign countries a very effective advertisement, rather of the nature of an elaborate poster, or, perhaps we might say, one of those electric signs which are now so popular in London with the larger advertisers,—though it would cost a great deal less than does an electric sign.

Crusading In the Air.

Be that as it may, the fact remains that Trade Crusading is very much in the air. And we must all hope to see an Air Crusade with it.

There is a distinct psychological momentum gathering way in favour of British Trade all over the World. And naturally the great thing is to discover what the markets want.



OUR ANCIENT ALLIES.—A Portuguese Naval Seaplane (Fairey III.D, Rolls-Royce Eagle) at Macau, China. This is a sister machine to that which first completed the crossing of the South Atlantic, flown by Commander Sacadura Cabral and Captain Gago Coutinho of the Portuguese Navy.

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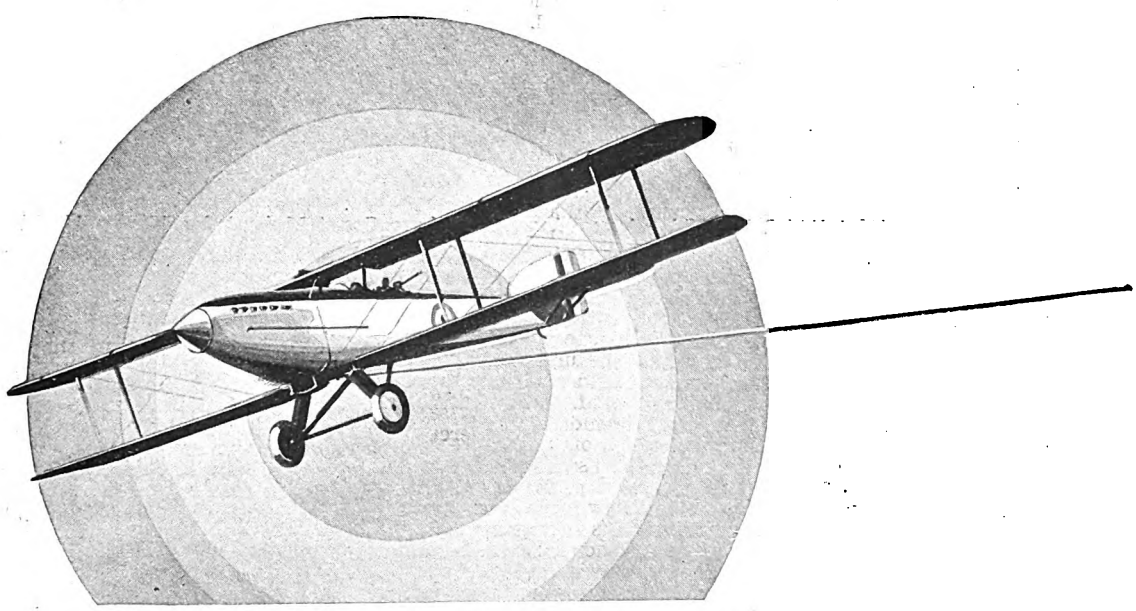

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Awarded to Sqdn.-Ldr. Hinkler, A.F.C for his 12,000 miles pioneer flight from England to Australia in 15½ days.

Sqdn.-Ldr. Hinkler used a

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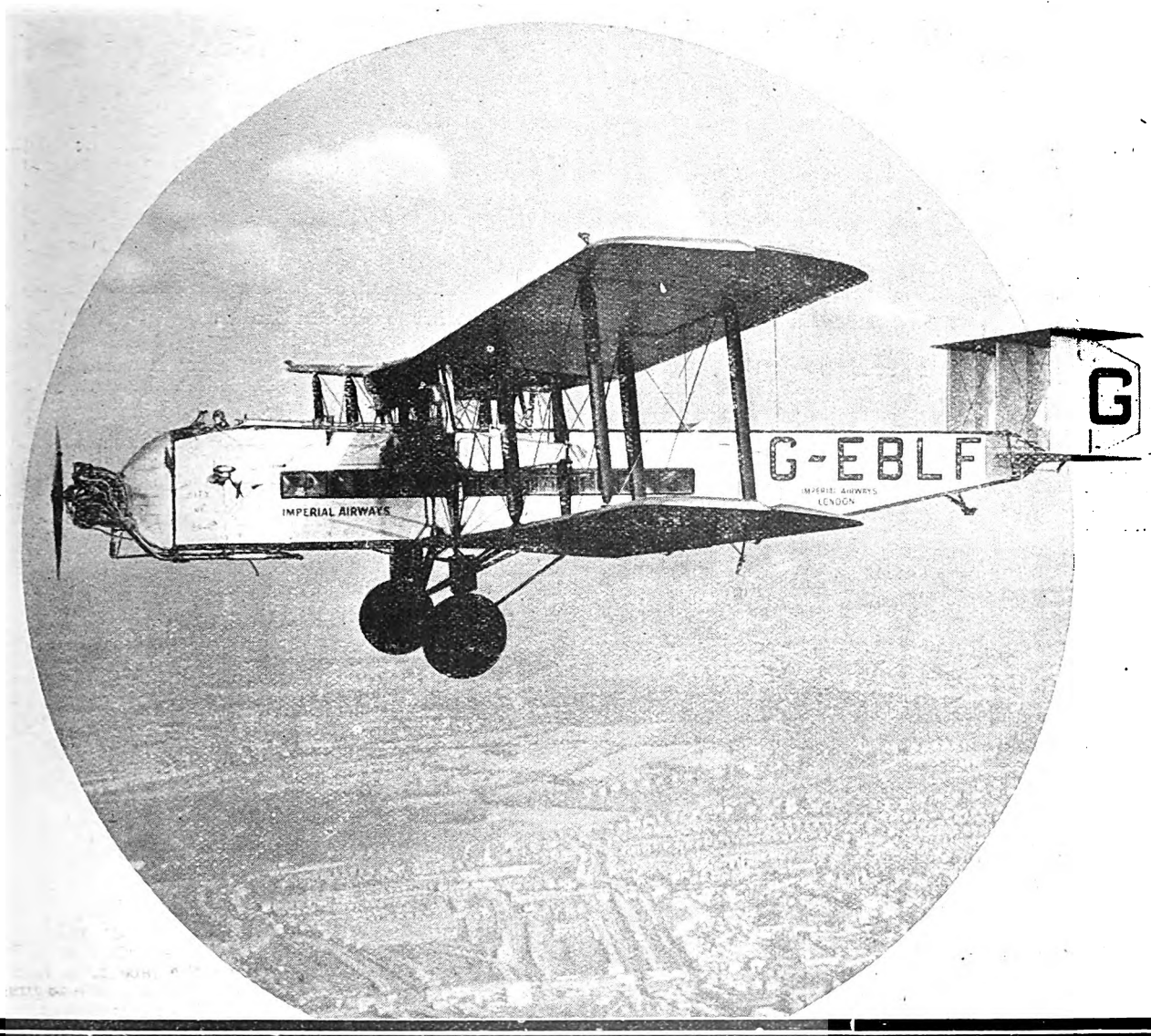

919,320 Argosy Miles

DURING the past 4 years (to October 31st, 1929), seven Argosies in the European Fleet of Imperial Airways Limited have flown 919,320 miles in 10,118 hours. They have carried over 50,000 passengers; they have crossed the channel nearly 4,000 times.

The Argosies are the safest, best paying and most easily maintained Air Liners in existence.

SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT LIMITED.
Works and Aerodrome: Whitley, Coventry. London: 10 Old Bond Street, W.1

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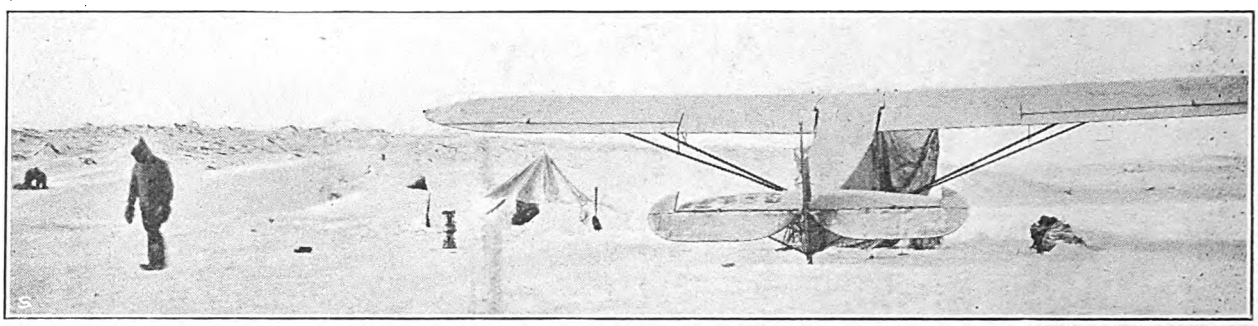

WHAT A LIFE!—An air-transport camp near the Arctic Circle in Canada.

High Country.

Much in the same way, if we wanted to sell passenger-carrying aircraft to Bolivia, where Mr. Clapham and Mr. Banting are already doing such good work in demonstrating to the Bolivians the high quality of British aircraft, we should not be doing ourselves much good by sending up to La Paz at 13,000 ft. ordinary light aeroplanes of types which are quite popular as passenger-carriers at low levels in Europe.

Among recent photographs which have reached this office from La Paz was one of an American single-engined cabin monoplane, of precisely the type which is so popular in Canada. Somehow it had struggled up to La Paz, having consumed most of its load of petrol in getting there. There it was filled up with gas, and took on quite a reasonable load of passengers and freight.

When it tried to take off from the aerodrome from which the Bolivian Army does its every-day training, according to all accounts the machine ran for miles and took such a long time to come unstuck that the onlookers thought it was never going to get off the ground at all. Eventually it did manage to stagger off and thereafter naturally the journey was simple enough because all it had to do was to follow the fall of the ground from its original 13,000 ft. down to a mere 5,000 or so where the river valleys begin.

Fortunately that happened to be an American machine and not an English machine, so we did not get the discredit for it. On the contrary our aircraft, which are war-machines, perform regularly at that height and are particularly suited for the job. And so the local prestige of British aircraft is very high.

Hot Climates.

This same matter of high aerodromes, aggravated by hot climate, has already given quite a lot of trouble in Central Africa. Even such experienced aviators as Lt.-Col. van Ryneveld and Capt. Brand, as they were at that time, made the mistake of trying to take off from an aerodrome in Northern Rhodesia much as they would have taken off from any other aerodrome, and stalled before they were well off the ground. Since then quite a number of quite good pilots in ordinary standard aeroplanes, of various types and nationalities, have come to grief through treating their machines in Tanganyika and Rhodesia and Kenya just as they would treat them at home.

Much the same effects are produced by heat alone in Queensland. There they have found that at sea level the air is of about the same lifting value as is our air at 5,000 ft.

The other day an experienced pilot who had flown in those parts said that if you put an ordinary machine down when you are near the ground as you would on an ordinary English aerodrome, it simply falls out of your hand. That expression probably describes what happens better than any other, and in the same way in getting off a machine will run and run for what seems like miles before it takes to the air properly.

The inexperienced pilot thinks that there is something the matter with the engine or that the machine has gone slack, or that there is something wrong somewhere, whereas the only thing that is really wrong is the air. And so for regular use in such countries, and at such heights, we may have ultimately to build engines with higher compression and aeroplanes with bigger wings. That at any rate would give more satisfaction locally than would standard machines.

Incidentally, readers in Australia and India and Africa and South America, who may be tempted to buy American aeroplanes on the strength of their performances in Canada should be particularly careful about these points. They will find the performances of such machines almost useless.

Keeping In Touch.

All these considerations are a natural and necessary part of a successful trade crusade. One knows that readers of The Aeroplane all over the World are just as keen on buying British products as we here are on selling British products, and the best way in which readers overseas can make sure of getting British products when they want them is by letting us here know just what it is that they want.

For a good many years The Aeroplane newspaper has been the favourite reading of aviators all over the British Empire and for as many years The Aeroplane office has been a recognised clearing house for aeronautical ideas all

CANADIAN CONDITIONS.—An example of what our aircraft have to stand.

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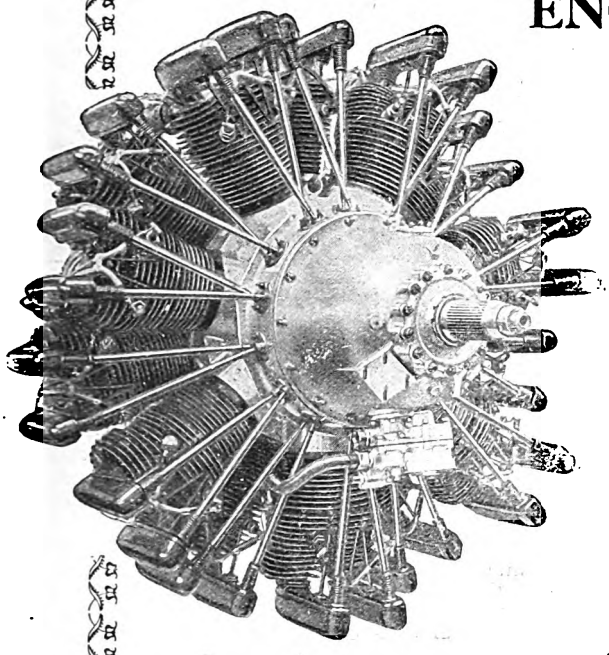
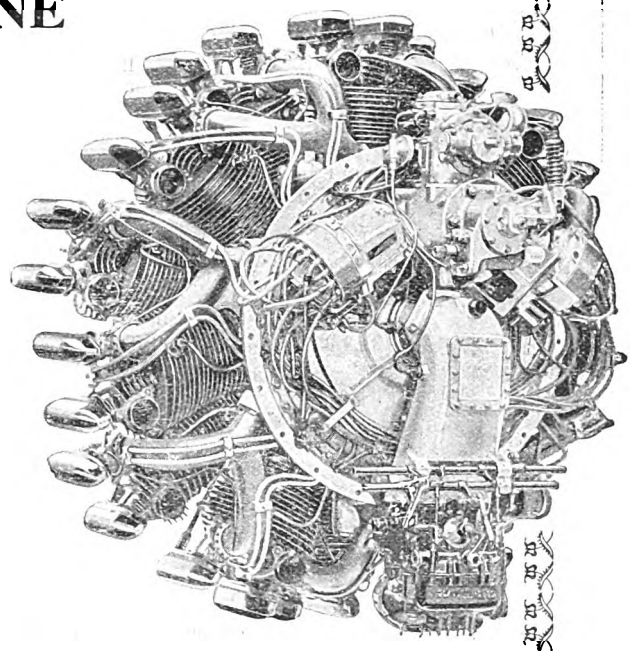
A New ARMSTRONG SIDDELEY ENGINE





The

Jaguar Major (Geared)

THE Jaguar Major is a brilliant addition to the world-famous range of Armstrong Siddeley air-cooled engines. It is made in two types, one with geared fan rated at 525 h.p. at 3,000 feet and developing a maximum of 560 h.p. at sea level, and the other with supercharger rated at 500 h.p. at 11,500 feet and developing a maximum of 450 h.p. at sea level.

The power weight ratio of these two types is 1.75 lbs. (.79 Kg.) per h.p. for the geared fan and 1.98 lbs. (.9 Kg.) per h.p. for the supercharger, while the overall diameter is 46.75 in. (1.187 m.).

ARMSTRONG SIDDELEY MOTORS LTD.,
COVENTRY, ENGLAND.
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FLOWN & KNOWN ALL OVER THE WORLD

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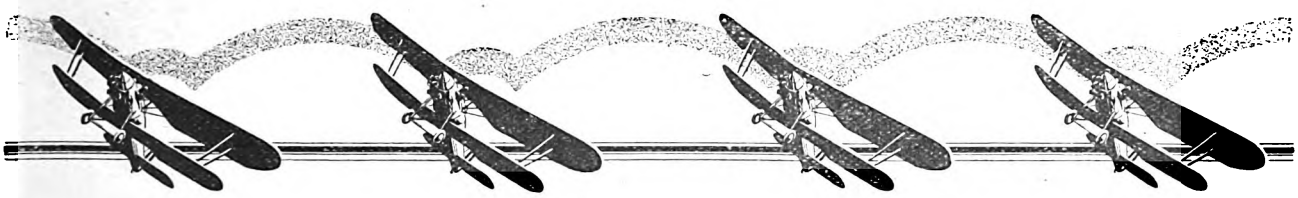

THE growth of civil aviation, particularly in Europe and America, has been the logical sequence to the increased knowledge of aerodynamics and aircraft engineering gained by experimental work on military aircraft. Early types of aeroplanes, built on a production basis, were used for military purposes, and the great majority of research work in design office, wind-channel, workshops and in the air has, in the past, been devoted to aircraft for warfare duties.

Twenty years ago the Bristol Aeroplane Co. Ltd. started to design, build and fly aeroplanes. These machines rapidly gained an unrivalled and world-wide reputation for excellence. During the war every belligerent nation proclaimed the superiority of the "Bristol" fighters. The experience of more than twenty years, together with the same rigid adherence to the highest qualities of design and workmanship, has maintained the pre-eminence of "Bristol" machines in all corners of the world.

THE "Bristol" AEROPLANE Co Ltd

FILTON, BRISTOL.

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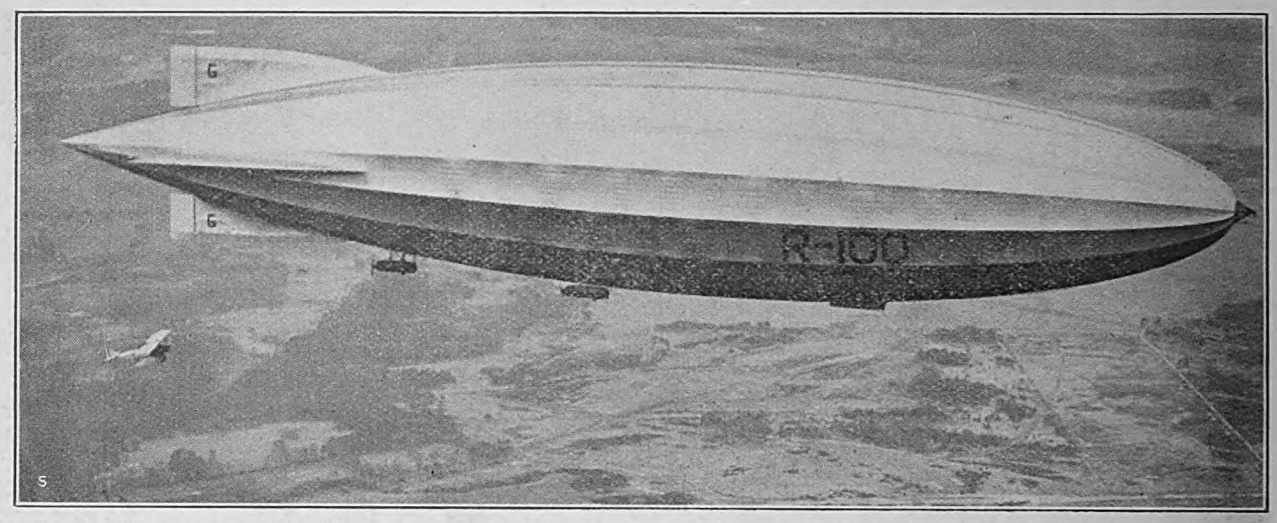


A SENSE OF PROPORTION.—A photographic aeroplane of the R.A.F. taking kinematograph pictures of the pulsating fabric of R.100.—*(R.A.F. Official photograph.)*

THE R.100's ENDURANCE TEST.

THE AEROPLANE of Jan. 29 reported the start of the R.100's endurance test. This was completed at 15.30 hours on Jan. 29 after the airship had been in the air for over fifty hours.

This test was made over the southern and western half of England. After passing over London, as previously reported, the airship went south-westwards again. Finally she turned and went back to Bedford by way of Falmouth, Truro, Barnstaple, Bideford and Bristol.

The most interesting feature of this long flight was the fact that for nearly all the trip the ground was obscured by clouds, through which the ship travelled most of the way.

This was made possible by the use of radio bearings sent from the direction-finding stations at Croydon and Pulham. Another interesting feature was the making of weather charts on board. These were compiled from information received by radio.

AN ADEQUATE REASON.

On Jan. 27 the Oxford University Air Squadron issued a notice which read as follows:—

"R.100 took the air at 9.30 a.m. to-day for a 48-hour test with Major Scott on board. In consequence it is regretted that his Lecture is unavoidably postponed until 8.30 Monday next, Feb. 3."

This is probably the first time on record that a lecturer has been so carried away by his subject that he has had to postpone his lecture.

THE "GRAF ZEPPELIN."

Dr. Eckener has stated, according to *Reuter*, that the proposed trip of the *Graf Zeppelin* over the North Pole has been definitely abandoned. The reason given is that no satisfactory solution has been found of the problem of insuring the crew.

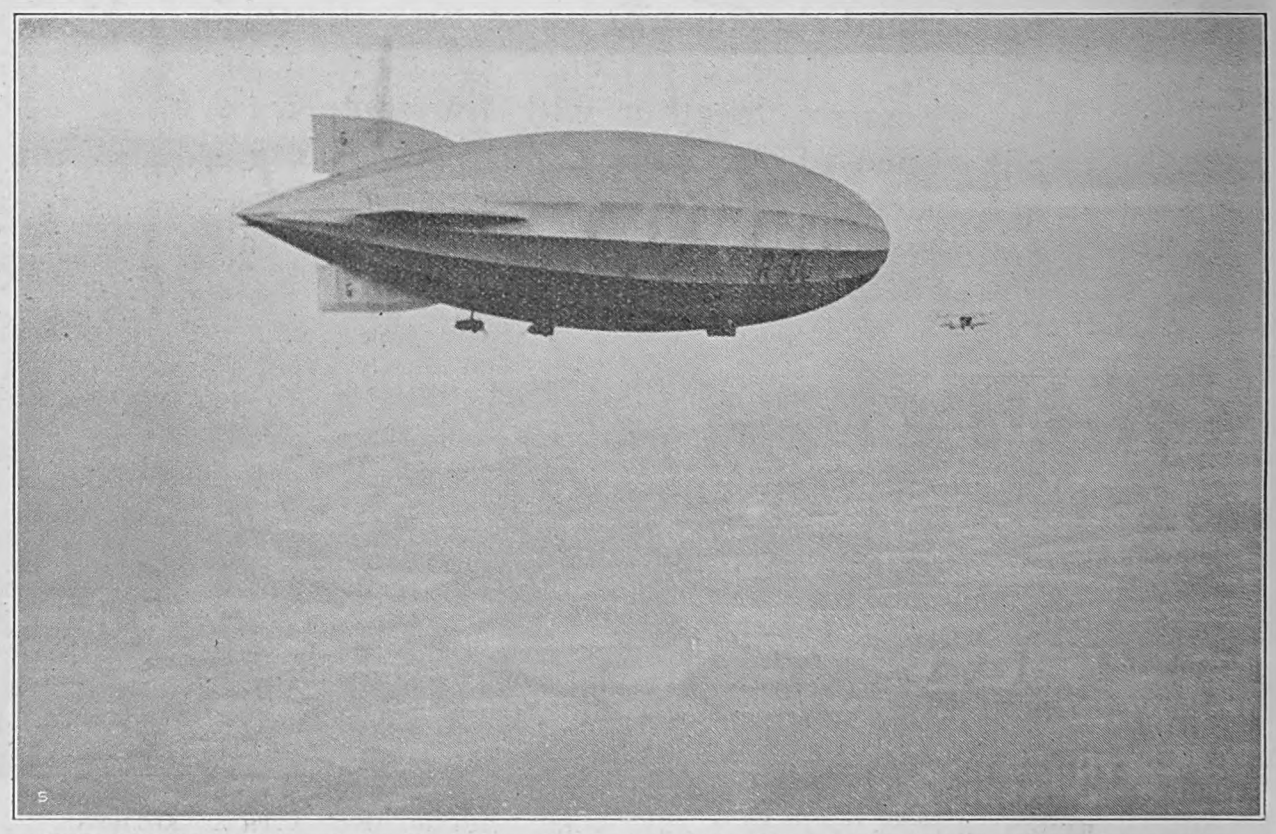
Presumably this means that the premiums required by the insurance people were too high, or that the crew would not sign on unless insured by their employers against special polar risks.

Also there is a possibility that though all meteorological science may have been in favour of fine and dependable weather for the trip, and the Arktis Society may have had all the money needed, the Zeppelin firm may still have been unwilling to risk their ship, and may have asked such covering terms from the insurance firms that those firms may have refused to insure it, and so may have made the trip impossible.

The *Graf Zeppelin* is to go to Geneva during the next Assembly of the League of Nations.

From the same source of information one learns that Dr. Eckener said that a German-American aerial navigation company would be formed in March,—one supposes an offshoot of the existing Goodyear-Zeppelin combine.

Dr. Eckener also said that airships would be built to make the East-to-West Atlantic crossing in three days.



WITH ESCORT.—R.100 and the kinematograph machine. This picture, better than any other, gives an idea of the relative size of the airship and a normally large aeroplane.—*(R.A.F. Official photograph.)*

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REMISSNESS AT ST. INGLEVERT.

The following letter will be of interest to cross-Channel aviators:—

Sir,—Having read with great interest the remarks contained in your "Croydon Notes" in last week's number of The Aeroplane concerning the failure of St. Inglevert to wireless Mr. Black's arrival over that aerodrome after having crossed the Channel, may I take up a little of your space in bringing to notice several occurrences of a like nature which have happened to me on a number of occasions when crossing the Channel? My reason for doing so is that the utter undependability of the service on the French side of the Channel is becoming a very serious matter to the private owner.

I have on two occasions crossed the Channel from Calais to Lympne without being signalled across, although I circled the Calais Lighthouse on each occasion three or four times. And on three occasions I have crossed from Cap Alprech without Lympne being informed.

I may mention that this has occurred on each occasion after having continued to circle the lighthouse until the man on duty there has seen fit to come out and signal to me that he has read my registration letters.

On one of these occasions, having circled, I set off towards Lympne against a strong wind, heavy rain, and with low clouds at about 150 feet, the visibility being about a quarter of a mile, under the misapprehension that Lympne knew that I was on the way and therefore, should any mishap occur owing to the sticky weather, help would be forthcoming in due course.

Having landed at Lympne, where the clouds were down on the hangar roofs, I was informed that they had had no signal of my crossing from the other side, and only after I had been on the ground for over twenty minutes did the signal come through on the wireless to say that I had just then left Cap Alprech, forty minutes after I had actually done so.

On several occasions I have also met with extreme slackness at Le Bourget. On one occasion, having informed the necessary officers that I should be leaving Le Bourget at 6.30 p.m. the next day, I was told on arrival at the aerodrome that all the regular services were over for the day and therefore I could not leave because the wireless officer had gone home and would be unable to inform Croydon of my departure. In the end I persuaded them to let me have my machine and came over without being signalled at all.

On another occasion, having left Le Bourget at about midday, with my papers duly signed and stamped, on arriving at Lympne for Customs they were amazed to see me, as they had had no intimation that I had left Paris, neither had they heard that I had circled at Cap Alprech.

In conclusion, one of the most farcical situations arose only last Sunday. I informed the Customs Gendarme, the Control Officer and the Official who deals with the triptiques on Saturday last that I should be leaving Le Bourget next day between twelve and one. On arrival at the aerodrome at 12.30, with a friend who had an appointment at Heston Aerodrome at 3.30, I was told that I could not leave for at least an hour and a half, for three reasons:—

(1) The Control Officer was having his lunch in the buffet and his Deputy was not empowered either to stamp my log book and give me leave to depart, or even to unlock the hangar containing my machine.

(2) The Official who attends to the triptiques was also at déjeuner at his house some distance from the aerodrome.

(3) The Customs Officer was also at his midday meal.

I overcame these difficulties by:—

(1) Going to the buffet and arguing with the Control Officer, who, although he refused to leave his *soupe*, told me I could send his Deputy up to him with the necessary ink and paper to sign up and stamp my log book.

(2) By sending a taxi to fetch the triptique gentleman from his house. He arrived very hot and annoyed, and having filled in and stamped my triptique, would not let me leave (for some reason best known to himself) until I had told him how big a landing fee I had paid last time I landed at Abbeville about two months ago. In point of fact I was unable to remember the exact figure, so that in the end I told him a purely imaginary amount of ten francs, which seemed to satisfy him. He then put to me the same question concerning Berck Aerodrome.

In the end I managed to leave Le Bourget at 1.20, after forty minutes sending taxis, tipping heavily, and running through a whole lot of other unnecessary paraphernalia, and all this when they had been informed the day before at what hour I should be leaving on the Sunday.

One feels certain that there must be many other private owners who have had similar experiences. Would it be possible for us to get together and make a representation to either the Air Ministry or the Royal Aero Club, at any rate some person or body who has the necessary power to see that the French do not entirely ignore carrying out those services which they have presumably promised to provide under some international agreement.

(Signed) A. C. M. Jackaman.

Jan. 23, 1930.

IMPORTANT DATES.

Feb. 5.—Royal Aero Club's Banquet at the Savoy Hotel.

Feb. 6.—Mr. Maccoll's lecture before the Royal Aeronautical Society.

Feb. 7. British Empire League Luncheon to Lord Thomson at British Empire Club.

Feb. 13.—Senor J. de la Cierva's lecture before the Royal Aeronautical Society.

Feb. 19.—Dr. Georgii's lecture before the Royal Aeronautical Society.

Feb. 27.—Mr. Rowledge's lecture before the Royal Aeronautical Society.

Mar. 5.—Wing-Cdr. T. L. Leigh-Mallory's lecture before the Royal United Service Institute.

Mar. 6. Major F. M. Green's and Mr. H. C. H. Townend's joint lecture before the Royal Aeronautical Society.

Mar. 8, 10.—International Gliding Congress at Darmstadt.

Mar. 10.—Herr Wronsky's lecture before the Royal Aeronautical Society.

April 3.—M. M. P. Grimault's lecture before the Royal Aeronautical Society.

June 28.—Royal Air Force Display at Hendon.

July 20.—Aug. 7.—Round Europe Race.

Nov.—Paris Aero-Show.

THE GAS LIGHT AND COKE CO.'S BEACON.

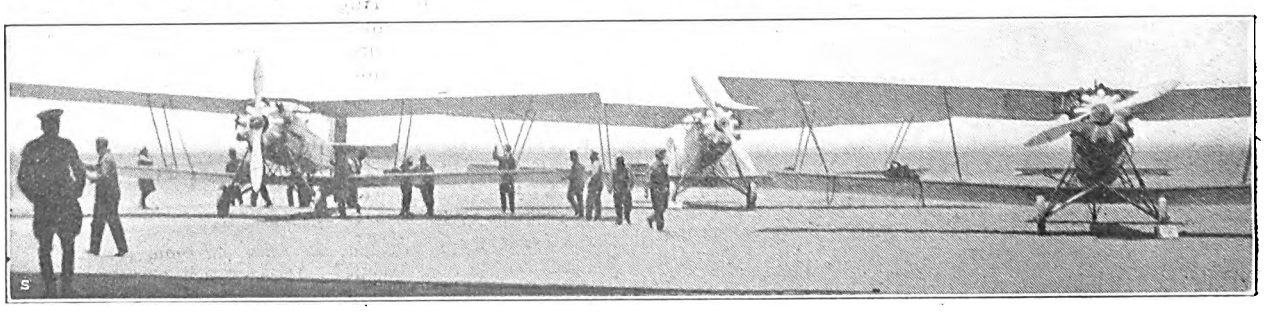
One hears that the enormous gasometer at Southall, which is 300 feet high and a most imposing landmark, is to be outlined with red obstruction lights. This shows most commendable foresight on the part of the Gas Light and Coke Co., who are thereby taking every possible precaution against any accident or disaster.

One gathers further that there is a likelihood of the work being extended to include a flashing beacon. This would be a definite aid to navigation. Such a beacon would be the first of its kind to be erected in this country.

Such a flashing light would be effective and useful advertising. One can imagine the forlorn Moth owner hurrying home in the dark and making a thankful landing by the directional aid of the beacon. The publicity that might result if such a wanderer hit the gasometer in the dark could not be particularly beneficial even if the actual result produced more candle-power than a flashing beacon.

BACK NUMBERS FOR SALE.

A reader of The Aeroplane has the following issues of *The Aero* for sale:—1d. issues, Nos. 85 to 96 (Vol. IV); 6d. issues, Nos. 97 to 107 (Vol. V and VI); Nos. 109 to 116 (Vol. VI), and Nos. 118 to 122 (Vol. VII). Offers for the lot should be sent to: A. G. Bakewell, Esq., 33, Kenley Road, Merton Park, S.W.19.



ON THE ROOF.—Vickers Vespas (Jupiters) of the Bolivian Army at La Paz. The aerodrome is at 13,000 feet.

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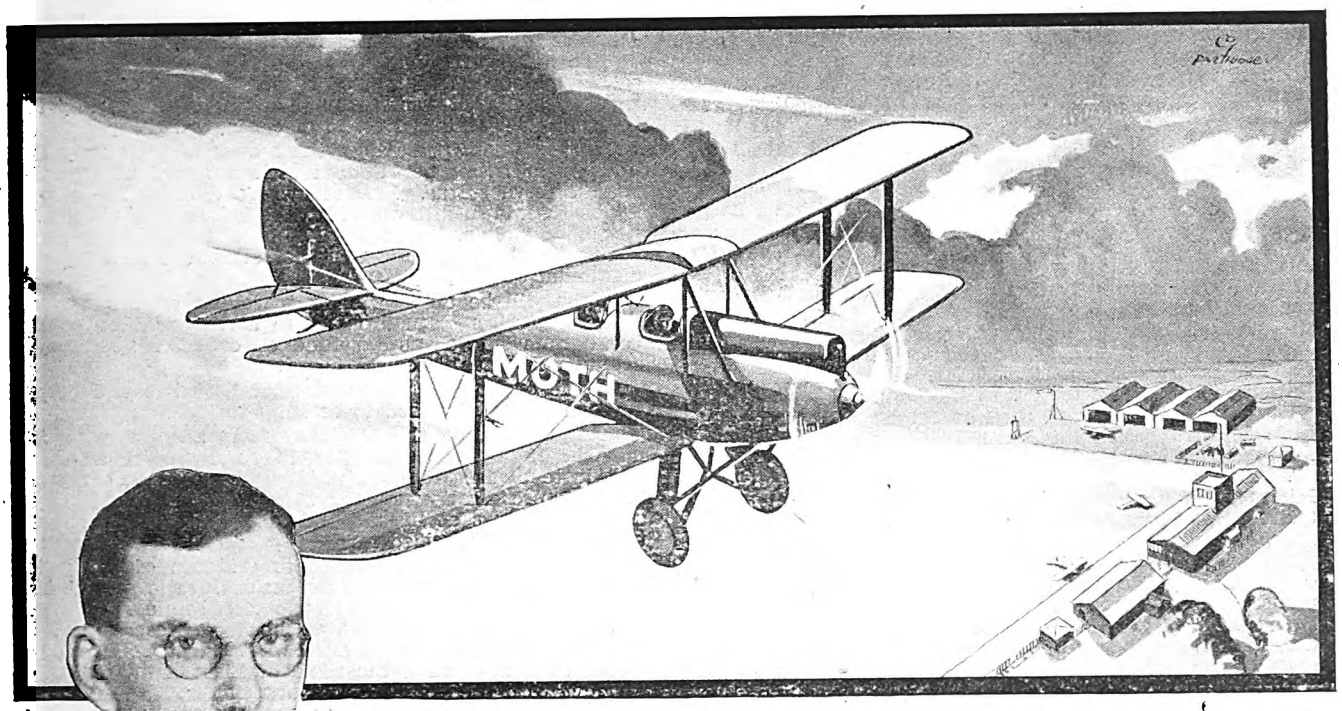

Mr. F. C. Chichester

The extraordinary ease of flying a MOTH

AMATEUR'S GREAT FLIGHT TO AUSTRALIA

Mr. F. C. Chichester, a private owner of a Gipsy Moth, left Croydon on December 20th and landed at Port Darwin, Australia, after only 17 days' flying.

The Daily Telegraph says: "Mr. Chichester's untrumpeted exploit stands out as one of the really big flights, not only as an example of pluck and determination, but also because it illustrates so convincingly the utility of the light two-seater aeroplane of 90 h.p. to 100 h.p. Mr. Chichester is not a professional airman or mechanician . . . he had not many thousands of flying hours' experience — he only became a pilot last August — and he is in every respect, except achievement, an amateur."

Such a feat ably brings home the simplicity of the Moth's control and the ease of learning to fly; and, more than this, it adds yet again to the ever-growing list of Moth's long distance flights to every corner of the Empire.

THE BOOK OF THE MOTH

"The Standard Book on Private Flying"

Send for your copy of "The Book of the Moth" which tells you why you should fly . . . how and where to learn to fly, and how little it costs to fly a Moth. Price 1/8 post free.

THE DE HAVILLAND AIRCRAFT CO., LTD.,
STAG LANE AERODROME,
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LICENSEES, SELLING AND SERVICE AGENTS THROUGHOUT THE WORLD.

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THE TRAINING OF PILOTS IN ITALY.

Signor Balbo, the Italian Air Minister, has drawn up a scheme for the formation of a number of what are known as Air Touring Squadrons throughout Italy. The functions of these squadrons will be two-fold in that they will provide facilities for *ab initio* as well as advanced or reserve training.

They will be equipped with light aircraft of a type used by our Light Aeroplane Clubs, and they will bear the same relation to the *Regia Aeronautica* as does the Italian equivalent of the Boy Scout movement to the Italian Army. That is, they are primarily of a military training character, and the club atmosphere as it is known in this country is entirely absent.

The decree of constitution and the regulations governing the working of the squadrons have been issued. Squadrons will be formed at seventeen cities as follow: Milan (Taliedo), Turin (Mirafiori), Rome (Centocelli), Ferrara, Venice, Padua, Brescia, Verona, Naples, Pisa, Genoa, Palermo, Bari, Leghorn, Ancona, Portorose, and Loreto.

Certain of these cities, such as Naples or Venice, which have both an aerodrome and a seaplane station, will have landplane and seaplane squadrons.

The following is the provisional allotment of aircraft: Milan, one squadron of 8 Fiat A.S.1 and one squadron of 8 Breda 15; Turin, 12 Fiat A.S.1; Rome, 8 Fiat A.S.1; Ferrara, 8 Fiat A.S.1; Venice, 8 Fiat A.S.1 and 8 Breda 15 seaplanes; Padua, 6 Fiat A.S.1; Brescia, 4 Fiat A.S.1; Verona, 4 Fiat A.S.1; Naples, 8 Romeo Ro.5 and 6 Breda 15 seaplanes; Pisa, 8 Breda 15; Loreto, 6 Breda 15; Genoa, 8 Breda 15 seaplanes; Palermo, 4 Breda 15 seaplanes; Bari, 6 Breda 15 seaplanes; Leghorn, 6 Breda 15 seaplanes; Ancona, 6 Breda 15 seaplanes; Portorose, 6 Breda 15 seaplanes.

Two centres, Milan and Venice, are initially equipped with the maximum number of machines to be provided by the Ministry of Aeronautics. Other centres are equipped in proportion to the number of pilots of the Air Force Reserve attached to the respective districts

The regulations call for a minimum of ten hours' training per annum of which not more than 4 hours shall be dual in the case of *ab initio* pupils. Pupils unable to go solo after 4 hours' training will be turned down.

The ten hours of training are fixed as a minimum for pilots to be declared trained. Within this period pupils must complete two efficiency tests. These are: To glide with engine throttled from a minimum height of 1,000 metres and land not more than 150 metres from a predetermined mark, and to make a cross-country flight of 100 kms. in a closed circuit during which they must reach a height of 2,000 metres and remain there for at least 15 minutes.

The officer commanding the squadron may authorise trained pilots to make supplementary flights up to a maximum of 15 hours on machines of the squadron. The Air Ministry may also authorise flights other than those specified in the regulations.

The period of training, of a maximum of 40 days, may be completed, not necessarily in a single period, any time between Feb. 15 and Dec. 15 of each year.

Trained pilots possessing their own aircraft may do 5 hours' solo flying per annum with a squadron to retain their reserve status. Private owners desiring to learn to fly on their own aircraft with a squadron may obtain free petrol and oil sufficient for 10 hours' training flying, and they may also apply for a further allowance to complete a maximum of 20 flying hours.

Pupils will be able to claim travelling expenses to and from the training squadron up to a maximum of 40 days per annum as well as a refund on expenses necessary to attend an annual medical board.

At the end of the year a sum of 1,000 lire will be paid to each person declared to be fully trained.

After completing the efficiency tests a pupil who is a member of an Aero Club and in possession of a civilian certificate of the 3rd class will be permitted to carry passengers, presumably not for hire or reward, during the successive hours at his disposal to complete the maximum training period specified in the regulations.

This new system, which bears evidence of being very carefully evolved, will greatly assist in the problem of supplying personnel to the *Regia Aeronautica*. Hitherto flying personnel have come from the *Regia Accademia Aeronautica*, the equivalent of our R.A.F. Cadet College, or by direct admission with the rank of Lieutenant, or by enlistment with the grade of Warrant Officer.

All military pilots have hitherto been trained in civil schools at the expense of the State. This arrangement, while absolving the Service of the problems of training, was unsatisfactory. Schools were few and far between. The methods of training of the various schools were not always consistent. The equipment varied. Reserve pupils wasted a considerable amount of time and money while they travelled to and from the school and their home, and the disparity of schools often made it necessary for pupils living far away to do all their training in one period, a system that deterred many young men in business from taking up flying.

The new regulations have been designed to overcome all these difficulties and at the same time to encourage the youth of Italy to become airminded, by the introduction of a system which, while military in object, offers all the attractions of cheap flying such as is provided in this country by the Light Aeroplane Clubs.

THE FIFTH INTERNATIONAL AIR CONGRESS.

From Sept. 1 to Sept. 6 the Fifth International Congress is to be held at The Hague, Holland.

The First post-war International Air Congress was held in 1921. This conference was organised by the Chamber of Aeronautical Industries in Paris under the auspices of the French Government. The Second was held in 1923 in London under the auspices of the British Government.

The Third was held in Brussels in 1925 under the auspices of the Belgian Government, and was organised by the Royal Aero Club of Belgium. The Fourth was held in Rome in 1927 and organised by the Italian Government.

At this last meeting arrangements were made, on the invitation of the Government of the Netherlands, to hold the Fifth Congress at the Hague in 1930.

The Netherlands Government have asked the Royal Aero Club of the Netherlands to look after the detail organisation and the Club has formed a General Committee.

The first five officials of this committee form the Executive Committee of the Fifth Congress. They are the President of the General Committee, Mr. J. F. de Vogel, who is President of the Aero Club; the Vice-Presidents, Jonkheer I. L. Van Den Berch van Heemstede, who is Vice-President of the Aero Club, and Mr. E. Th. De Veer, Chief of the Aviation Section of the Ministry of Waterstaat; the General Secretary, Colonel H. Walaardt Sacré, who is General Secretary of the Aero Club; the Treasurer, Jhr. P. O. H. Gevaerts, who is Treasurer of the Club; and one member of the General Committee, Mr. A. Plesman, Director of the K.L.M. and the K.N.I.L.M.

The Congress will be divided into five sections: *Aerial Traffic* with Mr. Plesman as President; *Science and Technology* with Dr. E. B. Wolff as President; *Legal Questions* with Mr. J. Wolterbeck Muller as President; *Medical Questions* with Prof. Dr. J. Boeke as President; and *Aerial Tourism* with Mr. C. Kolff as President.

The languages of the Congress will be English, French, German, Italian and Dutch. The Congress will provide interpreters for these languages. Members who wish to speak in other languages must provide their own interpreter.

Members who send in memoranda for discussion are asked to see that such contributions reach the General Secretary before April 30.

The address of the General Secretary, H. Walaardt Sacré, is 3, Anna Paulownaplein, The Hague, Holland.

The President of the Scientific and Technical Section would appreciate especially the sending of memoranda about:—

1. The separation of the air flow from a boundary, the phenomena related with it, specially in view of practical application.
2. Calculation of the performance of an aeroplane from aerodynamic data.
3. Experiments on the stability of an aeroplane in flight.
4. Spinning.
5. Choice of the best airscrew. The influence of form and dimensions of aeroplane parts in the slipstream on the efficiency of the airscrew.
6. Long distance flights.
7. Experiments in a model-tank as a basis for the design of floats and flying-boats.
8. Strength-calculation of different kinds of wing constructions.
9. Heavy-oil engines.
10. Light alloys and composite steels in aeroplane construction.
11. Ice-formation on aeroplane parts in flight.
12. The measurement of the height above the ground in an aeroplane or an airship.

A CHANCE FOR OUR SCIENTISTS.

Mr. Travis Hoke of *Popular Science Monthly*, of 381 Fourth Avenue, New York, announces that his magazine will award annually a prize of $10,000 for the year's outstanding scientific achievement. This is the largest prize of its kind in America, and *Popular Science Monthly* is to be congratulated on being able to afford the luxury of giving such a prize. The Board of Award includes a number of people who are interested in and have quite a considerable knowledge of aviation, so evidently aeronautical science will stand as good a chance as any other.

LORD ROTHERMERE OFFERS A PRIZE.

The New York correspondent of *The Daily Mail* states, in a report dated Jan. 23, that Viscount Rothermere has offered a prize of £2,000 to the first Hungarian who flies from the North American mainland to Budapest.

And very nice too.—But why does not Lord Rothermere, like his late lamented brother Lord Northcliffe, do something for British Aviation, and relieve Lord Wakefield of Hythe of a little of his self-loaded burden as the Mæcenas and Patron Saint of British Aviation? After all, Lord Rothermere *was* our first Air Minister.

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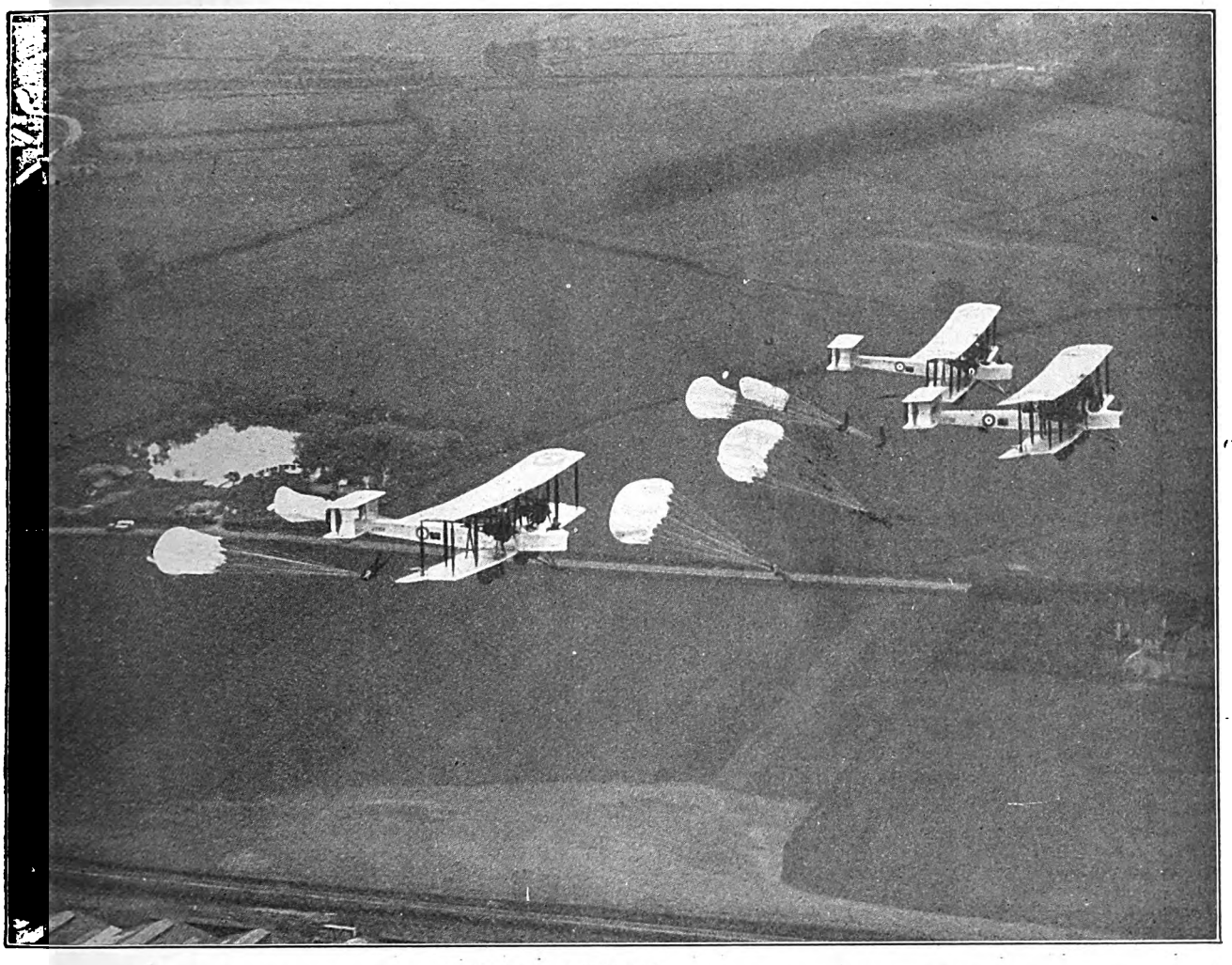
"SAFETY IN THE AIR——EVERYWHERE."



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In accidents it will decide that you are going to meet "YOUR FRIENDS, NOT YOUR ANCESTORS."——

THE INTERNATIONAL CATERPILLAR CLUB has now over 250 members.

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AIR-COOLED RADIAL ENGINES.

40-50 H.P. - 9 CYLINDERS.
95 H.P. - - 7 CYLINDERS.
120 H.P. - - 9 CYLINDERS.

Some Records won by the Salmson 40-50 h.p.

CONCOURS DE LA PRUSSE ORIENTALE, 1929.

Won by a KLEMM machine fitted with a 40 h.p. Salmson.

BELGIAN INTERNATIONAL CONCOURS (Touring Machines), SEPT. 29th, 1929.

Won by a KLEMM machine fitted with a 40 h.p. Salmson.

WORLD'S HEIGHT RECORD, 19th SEPTEMBER.

A R.W.D. machine, fitted with a 40 h.p. Salmson attained the height of 4,004 metres, a record for Aeroplanes under 280 kilos.

Until the British Factory is in production these engines can be supplied from France, with all necessary certificates.

BRITISH SALMSON AERO ENGINES LTD.,
CHURCH WHARF, CHISWICK.

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"LES AILES."

With the beginning of the year our French weekly contemporary *Les Ailes* celebrated its tenth birthday, and The Aeroplane offers its belated congratulations.

Les Ailes, most ably conducted by M. Georges Houard, its editor-in-chief, has earned for itself a reputation all over the World for the expression of a sound, dignified and consistent editorial opinion in the interests of French Aviation.

Its independent position has enabled it to criticise with delightful impartiality any phase of aviation that has not met with its conception of aeronautical progress. Its breadth of outlook, expression of views, choice and presentation of news, descriptions of new aircraft, and so forth, have always been consistently good and in a style distinctly its own.

The Aeroplane, on behalf of British Aeronautics, offers to M. Georges Houard and his excellent paper the good wishes of all for continued success and prosperity, and at the same time congratulates the French Aircraft Industry on having such an excellent weekly journal behind it.

BOMBS VERSUS VOLCANO.

An Englishman in Central America, where U.S. Marines are busy keeping the indigenous population in order in the interests of trade, after the manner so well shown in the film called "Flight" tells quite an amusing story. Apparently the local bandits have been making themselves unpleasant shooting up villages, with the result that a couple of U.S. Marine Corps pursuit ships come out every morning loaded with bombs looking for them and come back about two hours afterwards minus the bombs. The correspondent doubts whether the 'planes often get near the bandits, as they have to search in directions indicated by local informers, who are probably sent as often as not to put them off the track. The disappearance of the bombs is explained by the rumour that the officers of the particular detachment concerned have a pool of 100 dollars for the pilot who stirs the continually smouldering local volcano into eruption with a direct hit.

NAPIER ADJUSTMENTS.

Mr. G. S. Wilkinson, who has been Chief Designer to D. Napier and Son, Ltd., for many years, was appointed Chief Engineer to the company in October last year. Mr. Wilkinson was responsible for a large proportion of the work in preparing the Napier Lion engines for the Schneider Trophy contests in 1927 and 1929. He was responsible for the modifications to the original Lion engine of 450 h.p. which enabled it to develop nearly double its original power and win the 1927 Trophy for this country.

For his work in connection with our winning of the 1927 Contest Mr. Wilkinson was presented with the Silver Medal of the Royal Aeronautical Society, as were the designers of the Supermarine S.5, Mr. R. J. Mitchell, and of the Fairey airscrew, Mr. P. A. Ralli.

Although the Lion engine was prevented from competing in the 1929 Contest, the modifications he incorporated in the latest racing Lion engine enabled it to give still greater horse power and present even smaller frontal area. This engine, in the Gloster VI monoplane, beat the previous World's Speed Record held by its predecessor, the Supermarine S.5.

Apart from pure racing the Lion engine has done a stupendous amount of flying in its standard form all over the World. Two outstanding examples of reliability credited to the Lion are the flight of four Supermarine Southampton flying-boats in formation from England to Australia and back to Singapore without any form of mechanical trouble, and the first non-stop flight from England to India in the Fairey long-range monoplane.

Mr. C. Charles, late Director of Works, Manager of Dennis Bros., Ltd., of Guildford, has been appointed Works Manager to the company and is taking up his position this month.

GENERAL SINEL DE CORDES.

On Jan. 29, General Joaõ José Sinel de Cordes, G.O.C. the Portuguese Military Aviation Service, died. He was born in August, 1867, and had a very distinguished military career. He enlisted as a private soldier in 1883, and worked his way up to General, which rank he attained in June, 1921.

Included in the Portuguese and foreign honours bestowed upon him is that of Commander of the British Order of St. Michael and St. George. He was appointed to command the Portuguese Military Aviation Service in July, 1929, and his appointment was very well received.

He was also Vice-President of the Portuguese National Air Council, in which capacity he worked hard to achieve the establishment of Portuguese Air Lines, and he presided over the "jury" which conferred the exclusive right of the exploiting of these air lines (subject to various conditions) to the S.P.E.L.A.,—the Luso-French organisation.

All Service aviators will sympathise with our ancient Allies in Portugal in the loss their Air Service has suffered.

THE DUNLOP CHIEF.—Col. J. S. Matthew, C.M.G., D.S.O., who is responsible for the Dunlop Company's incursions into the Aircraft Industry, with good results for the progress of Air Transport.

DESERVED DISTINCTIONS.

On Jan. 30 Col. J. S. Matthew, C.M.G., D.S.O., was admitted to the Freedom and Livery of the Worshipful Company of Wheelwrights, and subsequently to the Freedom of the City.

Colonel Matthew is one of the senior officials of the Dunlop Rubber Company and is well known in the Motor Car, Commercial Vehicle, and Aero Industries. He has been responsible for improvements in wheels and motor carriage work, and twenty years ago, at the Argyll Company, introduced the present day system of four-wheel brakes and he Burt single sleeve-valve engine. Of late he has given much attention to the development of brakes and tyres and special wheels for aircraft.

He was first commissioned in 1892 in the 3rd V.B. Royal Highlanders (The Black Watch), and his name is still in the Army List as Honorary Colonel of the 62nd (Lowland) Divisional Train. He transferred in 1896 to the 9th Battalion, The Highland Light Infantry.

Thirty years ago in that regiment he took a prominent part in developing the use of the bicycle for Army purposes, and ten years later, in collaboration with the Officer Commanding the 14th London Regiment (London Scottish), successfully formed an experimental Mechanical Transport Column, which accompanied the regiment on a route march through the Western Highlands.

During the War 1914-18 he served in Egypt, Serbia, Macedonia, Palestine, France and Belgium. He was four times mentioned in despatches, was awarded the Order of St. Michael and St. George, the Distinguished Service Order, and the Serbian Order of the White Eagle with Swords, and was promoted to the substantive rank of Colonel.

Prior to the War he was a Military Member of three Territorial Associations—City of Glasgow, City of Edinburgh, and County of Lanark, and was awarded the Territorial Decoration in 1913.

Nine months before the outbreak of war in 1914 he organised the Motor Industry of Scotland for service in National emergency, for which he received the thanks of the Army Council through General Woolfe Murray, then Commanding the Forces in Scotland.

Shortly after mobilisation, when adequate provision of transport for the New Armies was a problem, he raised several units of horse and mechanical transport, for which he was again thanked by the Army Council.

Settling in the Royal Town of Sutton Coldfield after the War, he was elected to the Town Council there, and is a Vice-President of the local Branch of the British Legion, and a member of the British Serbian Units Branch.

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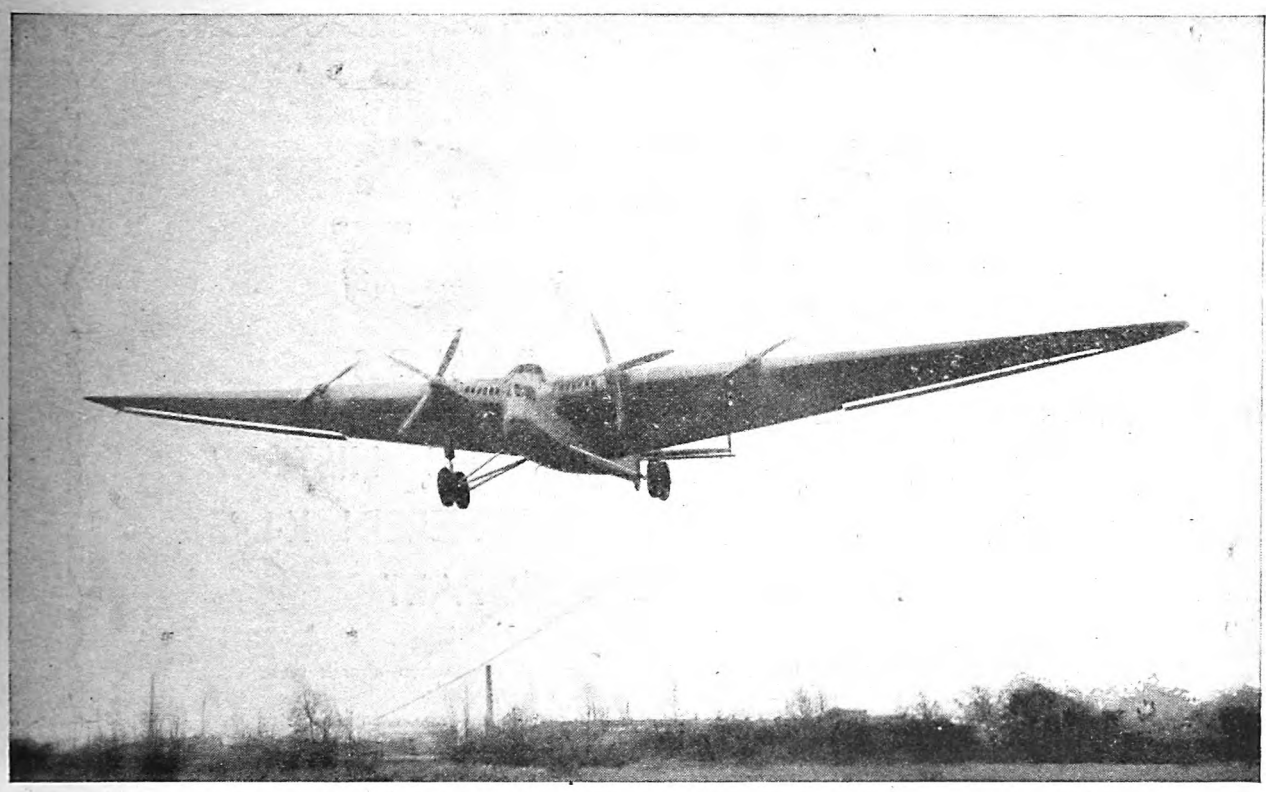

WORLD'S LARGEST AEROPLANE

Successful trials of the Junker G38

The great German monoplane, Junker G 38, is the largest aeroplane in the world fitted with a land undercarriage. It is constructed entirely of metal (mainly Duralumin) and measures 75 feet 5 inches in length with a wing span of 147 feet 6 inches. Its power plant of four Junker engines develops a total of 2,400 h.p. When fully loaded the machine weighs 24 tons and has a range of 2,170 miles. Throughout its recent successful trial flights Shell Oil and Shell Aviation Spirit were used exclusively

Another achievement on

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SPARKING PLUGS

SIXTEEN MILESTONES IN THE HISTORY OF THE BRITISH EMPIRE WHEREIN K·L·G PLUGS BORE THEIR PART

1916—**THE BATTLE OF JUTLAND.** The first time when aircraft were used to any large extent during a Naval Battle.

1918—**THE MOLE AT ZEEBRUGGE.** Imperishable glory won by Motor Boats.

1919—**FIRST DIRECT FLIGHT ACROSS THE ATLANTIC.** The late Capt. Sir John William Alcock, K.B.E., D.S.C., and Lt. Sir A. Whitten Brown, K.B.E., in a Vickers-Vimy Rolls.

1919—**FIRST FLIGHT FROM ENGLAND TO AUSTRALIA.** Capt. Sir Ross-Smith, K.B.E., M.C., D.F.C., A.M.C., and Lt. Sir K. M. Smith, K.B E., in a Vickers-Vimy Rolls.

1919—**FIRST DIRIGIBLE FLIGHT FROM ENGLAND TO NEW YORK AND BACK.** H.M. Airship R34 fitted with Sunbeam-Coatalen engines.

1920—**FIRST FLIGHT FROM ENGLAND TO THE CAPE.**—Sir Hesperus A. van Ryneveld, K.B.E.

1924—**FIRST FLIGHT FROM ENGLAND TO INDIA AND BACK.** Sir Alan J. Cobham, K.B.E., A.F.C., in a D.H. 50.

1926—**FIRST FLIGHT FROM ENGLAND TO THE CAPE AND BACK.** Sir Alan J. Cobham, K.B.E., A.F.C., in a D.H. 50.

1926—**FIRST FLIGHT FROM ENGLAND TO AUSTRALIA AND BACK.** Sir Alan J. Cobham, K.B.E., A.F.C., in a D.H. 50

1926—**FIRST FORMATION FLIGHT FROM CAIRO-CAPE TOWN-ENGLAND.** R.A.F. Fairey, Napier-engined Seaplanes.

1928—**FIRST LONE FLIGHT TO AUSTRALIA.** Sqdn.-Leader Bert Hinkler, A.F.C., in an Avro-Avian.

1928—**INDIA TO ENGLAND IN 4½ DAYS.** Capt. C. D. Barnard in a Bristol Jupiter engined Fokker Monoplane.

1928—**LARGEST FORMATION FLIGHT.** Four R.A.F. Supermarine-Napier Southampton Flying Boats. England-Australia.

1929—**FIRST PASSENGER AND MAIL FLIGHT TO INDIA AND BACK.** Armstrong Siddeley. Imperial Airways Air Liner.

1929—**FIRST NON-STOP FLIGHT ENGLAND TO INDIA.** R.A.F. "Fairey," "Napier" engined Monoplane.

1929—**THE DUCHESS OF BEDFORD'S FLIGHT TO INDIA AND BACK.** Capt. C. D. Barnard piloting a Bristol Jupiter engined Monoplane.

ALL WERE AVAILABLE — K·L·G's WERE CHOSEN

K·L·G SPARKING PLUGS, LTD., PUTNEY VALE, LONDON, S.W.15.

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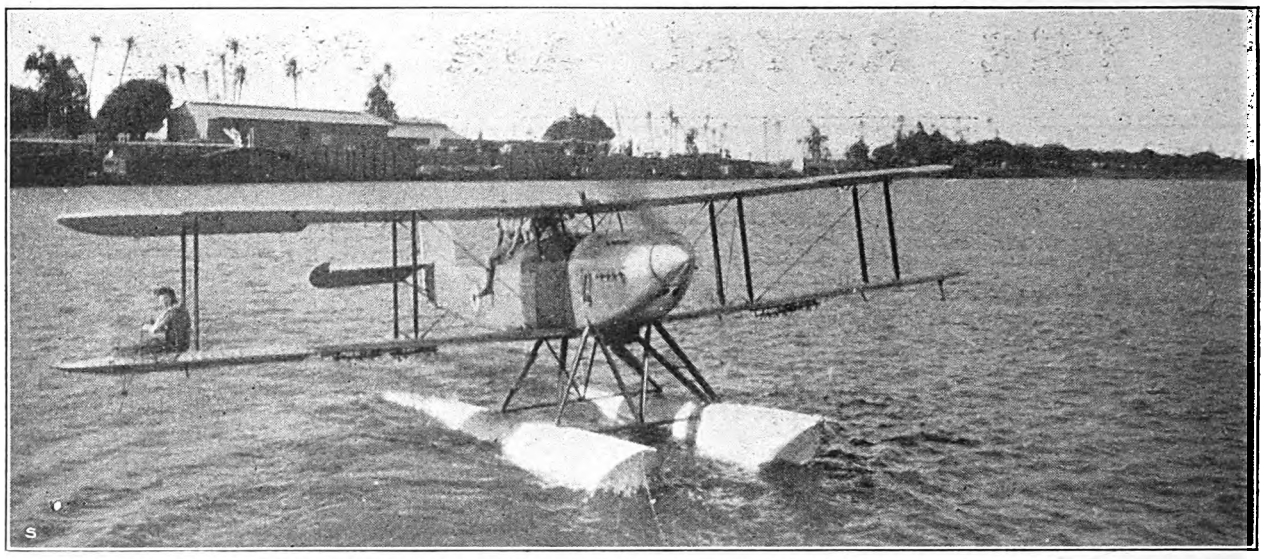


SWAMP STUFF.—A Fairey III.F of No. 47 (Bomber) Squadron, R.A.F., doing float trials for service in the swamp district of the Southern Sudan.

Flight Lieutenants F. N. Trinder, to H.Q., R.A.F., India, 21/1. A. P. Woollett, to Aircraft Depot, 'Iraq, 18/1. F. C. Griffin, to R.A.F. Depot, Uxbridge, 29/12.

Flying Officers H. E. Young, to R.A.F. Depot, Middle East, 18/1. L. F. Oldridge, to Aircraft Depot, India, 21/1.

Accountant Branch.—A. Holmes, to No. 4 F.T.S., Middle East, 18/1. A. W. P. Phillips, O.B.E., to H.Q., Aden Command, 21/1.

Flying Officers J. MacL. Murray, to No. 6 Sqdn., Middle East, 18/1. D. Sender, to H.Q., 'Iraq Command, 21/1.

Lord Trenchard.

The barony conferred upon Marshal of the Royal Air Force Sir Hugh Montague Trenchard is gazetted by the title of Baron Trenchard, of Wolfeton, in the County of Dorset.

Sir Philip Game.

The King has approved the appointment of Air Vice-Marshal Sir Philip Game to be Governor of the State of New South Wales in succession to Admiral Sir Dudley De Chair, whose term of office will shortly expire.

Air Vice-Marshal Sir Philip Game retired from the R.A.F. on Jan. 1, 1929. An account of his Service career appeared in The Aeroplane of Dec. 12, 1928.

An Award.

The King has approved of the award of the Medal of the Military Division of the Most Excellent Order of the British Empire to Plt. Off. Sidney Noel Wiltshire, Royal Air Force, for conspicuous gallantry displayed at Temple Bruer Landing Ground, Sleaford, on Oct. 21, 1929.

This officer, who is a pilot under instruction, was flying with his instructor, Flg. Off. H. E. Power, in an aeroplane that crashed on landing and at once caught fire. Having extricated himself from the wrecked machine, he found that his companion's foot was caught in the wreckage and that he could not get out.

Although fully realising the risk he was running, Plt. Off. Wiltshire re-entered the flames and helped Flg. Off. Power to get clear, during which process he received burns on his neck and face. Power's clothing was by this time well alight, and he would undoubtedly have lost his life but for the prompt and courageous action taken by his pupil. As it was, he was badly burnt.

Both officers were shortly afterwards taken by air to Cranwell Hospital. The aeroplane was completely burnt out.

The Cairo—Cape—Cairo Flight.

The Flight of four Fairey IIIF's (Napier) of No. 14 (Bomber) Squadron, R.A.F., which are carrying out the annual Service Exercise to the Cape and back, arrived at Capetown on Feb. 1, according to plan.

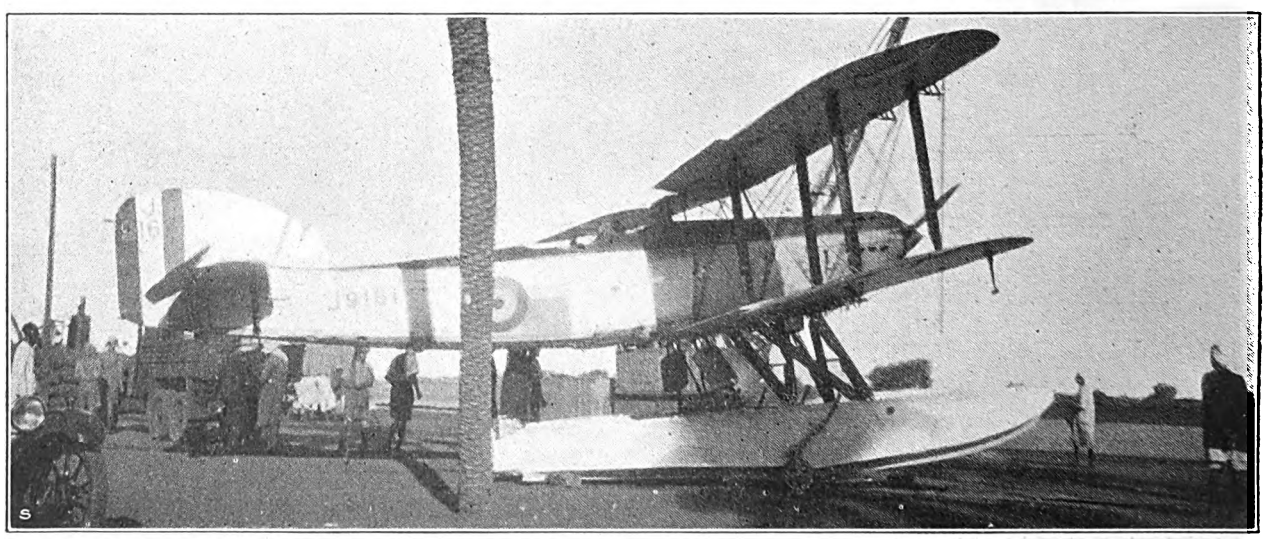
The Flight, which is commanded by Flt. Lt. C. B. Greet, left Cairo on Jan. 11. On Jan. 15, 16 and 17 they co-operated with the 4th King's African Rifles at Entebbe. On Jan. 21 and 22 they co-operated with the 2nd King's African Rifles at Tabora. They spent two days at Bulawayo and two days at Pretoria.

The return journey from Cape Town began on Feb. 4. They will spend Feb. 5 and 6 at Durban, Feb. 8 and 9 at Pretoria. On Feb. 10 they will be joined by a Flight of the South African Air Force, which will accompany them back to Cairo, reaching Heliopolis on Feb. 24.

The South African Air Force Flight will leave Cairo on its return journey on Mar. 4 and reach Pretoria on Mar. 18.

The personnel of the South African Air Force Flight consists of Brigadier-General A. J. E. Brink, D.T.D., D.S.O., Colonel Sir H. A. van Ryneveld, K.B.E., D.S.O., M.C., Major J. Holthouse, O.B.E., Captain Daniel, Captain Willmott, and three Serjeants.

The R.A.F. Flight is accompanied by Air Commodore A. G. Board, C.M.G., D.S.O., Chief Staff Officer, Middle East Command, who is acting as pilot of one of the machines. Air Commodore Board met with a motor-car accident while in Bulawayo and sustained slight concussion.



THE SHELTERING PALM.—One of the standard Service Fairey III.Fs (Napier) of No. 47 (Bomber) Squadron fitted with floats for experimental work in the damper part of the Sudan.

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SOMETHING HAPPENS QUICKLY—

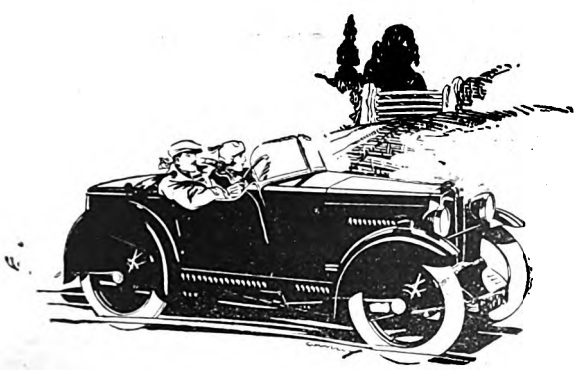
—— when you step on the accelerator of the M.G. Midget Sports.

Like the shot from a gun you surge up through the gears to over 60 m.p.h. in an incredibly short time. It is a sensation you should try—and we shall be glad to arrange it.

8/33 M.G. Midget Sports

2-seater £185 Sportsman's Coupe £245

The MG *Sports*



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The Staff College, Camberley.

The following officer has passed satisfactorily the course at the Staff College, Camberley, which ended in December, 1929, and is entitled to the letters *q.s.* after his name in the Air Force List:—Wing Cdr. A. T. Harris, O.B.E., A.F.C.

The R.A.F. Staff College.

The following officers of the Royal Navy and of the Army have satisfactorily completed the seventh course (1929) at the R.A.F. Staff College.

Royal Navy:—Lieut.-Cdr. S. N. Blackburn, D.S.C., R.N., Lieut.-Cdr. C. C. M. Usher, R.N.

Army:—Major K. M. Loch, M.C., R.A., Capt. C. W. Free, M.C., Indian Army.

The R.A.F. in India.

In the House of Commons on Jan. 27, in reply to a question by Brig.-Gen. Clifton Brown, the Secretary of State for India said that there were eight Squadrons of the R.A.F. in India with about 260 officers and 2,000 other ranks. No increase or reduction was at present contemplated.

Specialisation of Short-Service Officers.

The names of the candidates who sat for the examination held in December, 1929, for specialisation with a view to being granted permanent commissions are shown in order of merit below.

Eighteen officers reached the qualifying standard, and vacancies will be allotted to them as indicated ("E"= engineering, "S"=signals, "A"=armament). Subject to medical fitness, they will be posted to the following units, and arrangements should be made for them to join accordingly:—

(i) Home Aircraft Depot, Henlow, for specialist engineering course, beginning on Aug. 1—those marked "E."

(ii) Electrical and Wireless School, Cranwell, for specialist signals course, beginning on Sept. 1—No. 15.

(iii) Electrical and Wireless School, Cranwell, for short signals course, beginning on April 28 (followed by specialist signals course on Sept. 1)—Nos. 5, 14 and 18.

(iv) Armament and Gunnery School, Eastchurch, for specialist armament course, beginning on Sept. 1—No. 16.

The service on the active list of the officers who have qualified and are due to transfer to the reserve before Oct. 1, 1931, is hereby extended pending their consideration for permanent commissions on the results of their training. This includes No. 9, whose selection for medium service is cancelled.

Flying Officers:—1, Bradley, P. F. G., "E"; 2, Donkin, R. H., "E"; 3, Ashton-Jinks, C. P., "E"; 4, Miller, A. P., "E"; 5, Hatcher, V. G. A., "S"; 6, Edwards, R. C., "E"; 7, Barwell, P. R., "E"; 8, Bruce, J. D. F., "E"; 9, Gibbon, D. W., "E"; 10, Allen, A., "E"; 11, Tuttle, G. W., "E"; 12, Morshead, V. D., "E"; 13, Walker, G. H., "E"; 14, Calwell, A. K. K., "S"; 15, Nicholas, B. D., "S"; 16, Abraham, T. M., "A"; 17, Walker, H. J., "E"; 18, Keens, L. T., "S"; 19, Loch, H. G.; 20, Elton, J. G.; 21, Merrett, T. K.; 22, Russell, E. G. L.; 23, Collings, R. W. P.; 24, Turner-Hughes, C. K.; 25, Stevens, A. M.; 26, McNeil, W. C.; 27, Monro-Higgs, W. R.; 28, Weighill, G. R.; 29, Russell-Stracey, E. G. H.; 30, Stroud, R. W. A.; 31, Mackay, U. S.; 32, Mason, L. H.; and 33, Jenkins, G. H. G. S.

Special Assessments.

The following officers and airmen have been awarded special assessments as shown on completion of a course of *ab initio* flying training at No. 2 Flying Training School, R.A.F.:—

Special Distinction:—Plt. Off. E. L. Mole.

Distinguished Pass:—Plt. Off. G. B. Musson, Plt. Off. J. A. Brown, No. 364938 Sjt. Parr, R., No. 363349 Sjt. Burke, R. G., No. 363372 Sjt. Clift, A. E., No. 364268 Sjt. Stammers, C. V., No. 365630 Sjt. Farnsworth, T. H., No. 370733 Sjt. Stacey, W. J.

Notations have been made in the official records of the officers and airmen.

An Advanced Course in Armament.

An advanced specialist course in armament, to be known as the A* course, will be held at the Armament and Gunnery School, R.A.F., Eastchurch, every year, beginning on Mar. 1. The duration of the course will be two years, including twenty working months. For the present, two officers will be selected annually to undergo the course. At a later date the entry may be reduced to one officer a year.

Selection will be made by the Air Ministry from officers recommended by the C.O. of the Armament and Gunnery School on completing the specialist A course. The fact that an officer is so recommended will be understood to imply that he is a candidate for selection for the A* course.

An officer selected to attend the A* course will be required to sign an undertaking to the effect that he will continue to serve for a period of not less than five years from the date of end of the course.

The R.A.F. Memorial Fund.

The total amount of money given to the R.A.F. Memorial Fund between Oct. 1, 1929, and Dec. 31, 1929, by R.A.F. Units at home and abroad, was £11,550 13s. 1d. This total includes a sum of £9,000 from the Secretary of the Air Ministry, being the proceeds of the R.A.F. Display in 1929, and a sum of £2,300 from the Air Council, being part of the R.A.F. share of the profits of the Royal Tournament at Olympia in 1929.

American Recognition.

A trophy known as the "L. S. Thompson Speed Trophy" has been provided by a deed of gift between several members of the U.S. Naval Reserve Force and the National Aeronautic Association to be given to the pilot breaking the existing maximum speed record either in a landplane or seaplane. A replica will be given to the pilot and the trophy to the Aero Club, Government Department, or recognised organisation affiliated with the F.A.I.

The trophy has been awarded for the first time to Sq. Ldr. A. H. Orlebar, R.A.F., who, on Sept. 12, 1929, established the World's Speed Record of 357.723 m.p.h. on the Supermarine S-6 (Rolls-Royce engine).

The trophy is now being engraved and will be formally presented to the British Ambassador in Washington, and a replica will be sent to Sq. Ldr. Orlebar when completed.

The Late Flt. Lt. Jenkins.

A committee of officers of the R.A.F. has been formed to raise a subscription from those past members of No. 84 Squadron who served with the late Flt. Lt. N. H. Jenkins, O.B.E., D.F.C., D.S.M., to enable a presentation to be made to the Officers' Mess, No. 84 (Bomber) Squadron, R.A.F., to commemorate his memory.

Flt. Lt. Jenkins served with No. 84 Squadron from November, 1922, until September, 1925. His exceptional abilities as a pilot, his unfailing energy and keenness in whatever work was to be undertaken, and his constant cheerfulness endeared him to, and commanded respect from, all ranks.

The Committee suggest that subscriptions should be limited to one guinea. They should be sent to Flt. Lt. F. F. Inglis, R.A.F., Halton Camp, Wendover, Bucks.

The Committee, in conjunction with the Commanding Officer, No. 84 Squadron, will decide what form the presentation shall take.

Warrant Officer Dal Molin.

Group Captain C. R. S. Bradley, O.B.E., Air Attaché at the British Embassy in Rome, attended the funeral of Warrant Officer Dal Molin at Desenzano on Feb. 1. Wreaths were sent by the British Air Ministry, by the Commanding Officer and officers at Calshot, and by the non-commissioned officers at Calshot.

An Old Comrades' Association.

Encouraging support is being given to the project for forming an Old Comrades' Association for former members of the R.N.A.S., R.F.C., and the R.A.F.

Readers of The Aeroplane who are interested in the Association should write for particulars to William Coen, R.A.F. Station, Eastchurch, Kent.

R.A.F. SPORTS.

The Lafferty Cup.

The Lafferty Cup for 1929 has been won by Australia.

The Lafferty Cup is a trophy for competition in athletics among the Cadet Colleges of the British Empire. The R.A.F. College took part in 1929 for the first time.

The results were:—Royal Military College (Australia), 18 points, 1; Royal Military College (Sandhurst), 14 points, 2; Royal Air Force (Cranwell), 5½ points, 3; Royal Military College (Canada), 5 points, 4; Royal Military Academy (Woolwich), 3½ points, 5.

1½ Mile Relay.—Australia, 5 min. 27 2-5 sec., 1; Sandhurst, 5 min. 28 1-5 sec., 2; Cranwell, 5 min. 31 sec., 3; Canada, 5 min. 36 sec., 4; Woolwich, 5 min. 40 sec., 5.

One Mile.—Australia, 4 min. 36 9-10 sec., 1; Sandhurst, 4 min. 37 3-5 sec., 2; Cranwell, 4 min. 40 sec., 3; Woolwich, 4 min. 48 3-5 sec., 4; Canada, 4 min. 55 sec., 5.

High Jump.—Sandhurst, 5 ft. 9 in., 1; Australia, 5 ft. 8 6-10 in., 2; Woolwich, 5 ft. 6¾ in., 3; Canada, 5 ft. 5¼ in., 4; Cranwell, 5 ft. 3 in., 5.

50 Yards Swim.—Australia, 27 7-10 sec., 1; Canada, 29 sec., 2; Sandhurst, 30 1-5 sec., 3; Cranwell and Woolwich, each 31 sec., 4.

Rugby Football.

R.A.F. versus Leicester:—The R.A.F. were beaten by Leicester at Leicester, on Jan. 30, by a goal and six tries (23 points) to a goal and two tries (11 points).

Considering that this was their fifth match since the final trial the R.A.F. put up a very disappointing show. Admittedly they were up against a very good team, but it was not the team that Leicester plays against another first-class club. Included in the Leicester side were Wing Cdr. J. C. Russell, captain of the R.A.F. from 1924 to 1928, and Flt. Lt. G. R. Beamish, now captain of the R.A.F.

That Flt. Lt. Beamish was not playing for the R.A.F. was probably because he will not be available for the match against the Navy on Feb. 8, as this match is on the same day as the International between England and Ireland.

Wing Cdr. Russell is said to have retired from serious Rugger but anybody who saw this match must have realised that he is still a better scrum-half than anyone the R.A.F. have got to-day.

The R.A.F.'s worst and most deplorable failing in this match was in their tackling. One did not see more than three good tackles by the R.A.F. throughout the game. After

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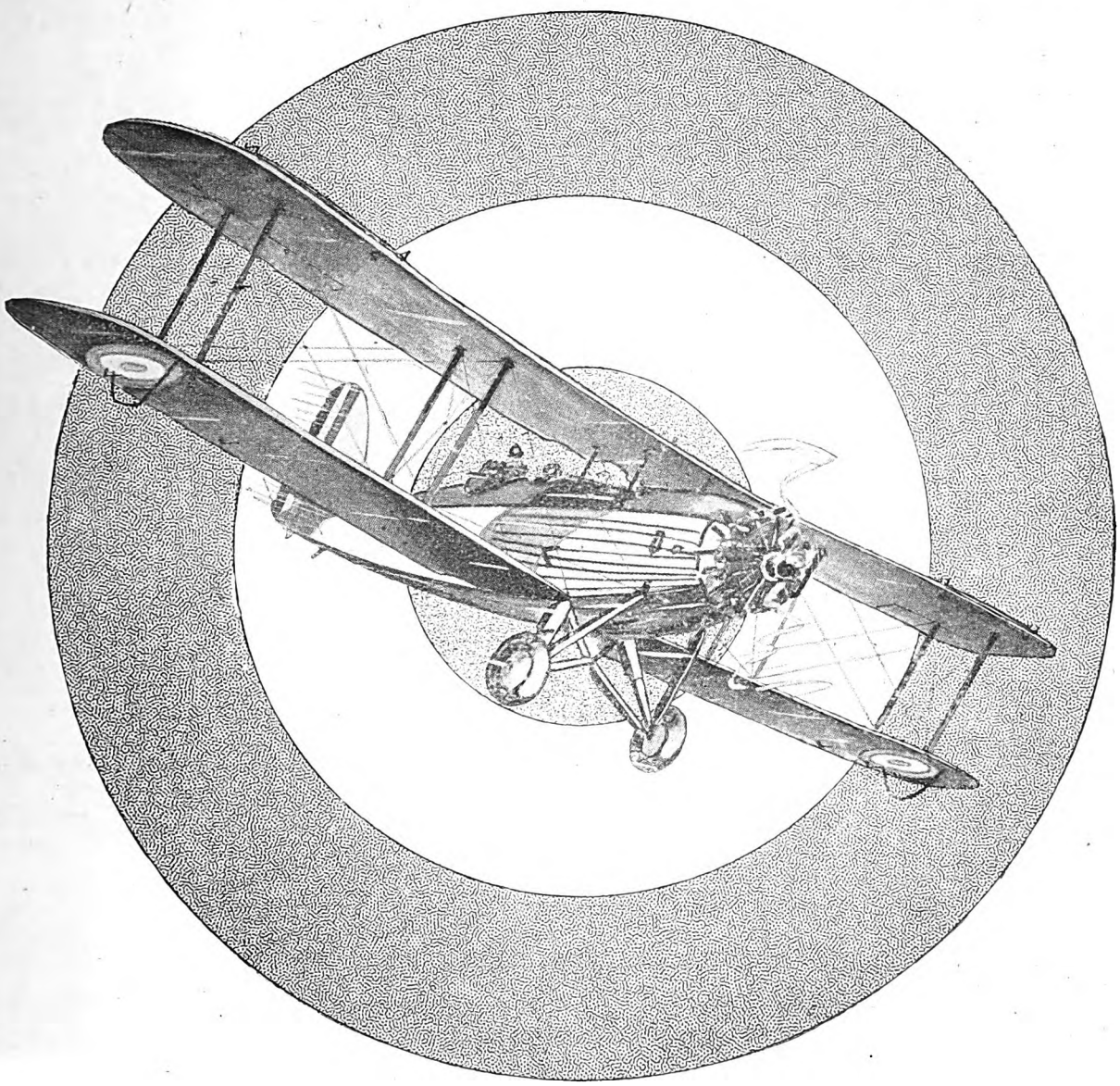
THE WESTLAND WAPITI



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seeing some four or five matches played by the R.A.F. College team from Cranwell this season, one could not help wishing that certain players in the R.A.F. team could be sent to Cranwell for a Rugger course.

Several times a Leicester player got clean away after being "tackled" by one or more R.A.F. players. Once Wing Cdr. Russell gave an accurate pass with three Air Force players hanging round his neck. Mr. J. R. Anty, the Leicester stand-off half, admittedly a brilliant player, walked through the Air Force defence whenever he felt like it and only the determination and foresight of the overworked full back, Plt. Off. Ievers, prevented him from piling up an even higher score.

The R.A.F. forwards were beaten throughout in the scrum but were fairly equal in the loose. An outstanding forward was Plt. Off. Wallace. At scrum-half, Plt. Off. Elsmie was out-manœuvred by Wing Cdr. Russell, at the base of the scrum, but showed dash and initiative, and what success the R.A.F. backs had was entirely due to his play. At stand-off half, Flt. Lt. Odbert reminded one of the hero in the film *Flight*, he seemed doomed to run in the wrong direction.

The threequarters handled well and Flg. Off. Cotton was fast on the wing, but their tackling was useless. At full-back Plt. Off. Ievers handled faultlessly and kicked well. Once he was hemmed in but took the ball on his foot and found touch, fielding and kicking in one movement.

Leicester scored in the first few minutes of the game from a forward burst. The Air Force equalised, Hodder going alone after a bout of short passes between Elsmie and Llewellyn. A beautiful opening by Russell gave Leicester the next try. The Air Force again levelled things when Elsmie broke through and made ground. Llewellyn took a pass from Cotton with one hand and scored a good try which he converted himself. Leicester scored three more tries before half-time. Elsmie made one great run half-way down the field but was unsupported and brought down near the line.

The second half started with a spectacular drop at goal by Ievers which only just missed. Beamish scored a good try for Leicester and later converted a try by Farndon. In the last minute Franks scored a try for the R.A.F.—C. M. MCA.

R.A.F. versus Bedford.—The R.A.F. drew with Bedford at Bedford on Feb. 1, each side scoring a goal. Flt. Lt. G. R. Beamish scored the try and Flg. Off. Llewellyn converted.

February Sports Fixtures.

Rugby Football:—Feb. 8, R.A.F. v. R.N. at Twickenham; Feb. 12, R.A.F. v. Middlesex at Richmond; Feb. 19, R.A.F. v. United Banks at Ealing; Feb. 26, R.A.F. v. Oxford University at Halton.

Association Football:—Feb. 12, R.A.F. v. Civil Service at Chiswick; Feb. 22, R.A.F. v. Wycombe Wanderers at Wycombe.

Hockey:—Feb. 5, R.A.F. v. Essex; Feb. 8, R.A.F. v. Tulse Hill at Kent House; Feb. 12, R.A.F. v. The Army at Uxbridge; Feb. 19, R.A.F. v. Middlesex at Uxbridge; Feb. 26, R.A.F. v. R.N. and R.M. at Beckenham, and R.A.F. College v. R.M.A. at Woolwich.

Boxing:—Feb. 6, R.A.F. v. Aldershot Command at Aldershot; Feb. 21, R.A.F. v. Oxford University at Halton.

Fencing:—Feb. 7, R.A.F. v. R.N. at Uxbridge; Feb. 13, R.A.F. v. Cambridge at Bertrand's; Feb. 14, R.A.F. v. Bertrand's at Bertrand's; Feb. 21, R.A.F. v. Tassart's at Tassart's; Feb. 26, R.A.F. v. Oxford at Oxford.

Skill-at-Arms:—Feb. 26, R.A.F. College v. R.M.A. at Woolwich.

AIR DEVELOPMENTS IN HONG-KONG.

The Hong-Kong Flying Club was established at a meeting in the City Hall on Dec. 20, at which His Excellency the Governor presided. The relationship of the club with the local Government is so unusual, and the position of the club in relation to the Empire is so important that no excuse is offered for lifting it from the part of this paper in which club affairs are usually discussed and putting it further forward. This organisation is largely due to the work of Mr. R. Vaughan Fowler, lately R.A.F., and every credit is due to his energy and initiative.

In the course of his address to the meeting His Excellency said that the objects of the Club were:—(a) To provide flying instruction. (b) To create air-mindedness in the Colony. (c) To make better known in the Far East British flying machines and British methods of flying. (d) To provide the necessary training for the nucleus of a Volunteer Air Squadron. (e) To provide another opportunity for social intercourse between all communities in the Colony without distinction of race or class.

Continuing, His Excellency said that Hong Kong was already the greatest shipping port in the Far East and the Government and the people of the Colony were determined to do everything which might assist Hong-Kong to take its rightful place as one of the best airports of the Far East. The Hong-Kong Government, with the full support and encouragement of His Majesty's Government, had now almost completed the construction of the Kai-Tak aerodrome at the head of Kowloon Bay. They were also about to erect, again with the help of His Majesty's Government, a suitable hangar on the aerodrome capable of housing, not only the machines of the R.A.F., but also those intended for commercial aviation and for the use of the Flying Club.

The Hong-Kong Government attached so much importance to the establishment of a Flying Club in the Colony that the Legislative Council had voted $60,000 as an initial grant to the Club and had also undertaken to pay the Club an annual subsidy of $30,000. These votes had received the approval of the Secretary of State for the Colonies.

His Excellency called attention to the practically limitless possibilities for aviation in China, because aviation had begun at a time when the Eighteen Provinces possessed very few railways, when scarcely any trunk roads suitable for motor traffic had been built, and when lawlessness ashore and piracy at sea suggested that the air might be a safer medium of transport than land or water.

He recalled how, years ago, he had made his way toilfully on foot and horseback through most of the Eighteen Provinces of China and that now a flight from Hong Kong to Peking should easily be made in two days, and a flight to Hankow from Hong Kong might be made in a day. If from Hong Kong a service could be connected with the Luft Hansa service between Berlin and Peking, the journey to England would take little more than a week. Such developments would completely revolutionise life in the Far East and would bring the Mother country much closer to Hong Kong. [His Excellency seems optimistic about our relations with Bolshevik Russia.—Ed.]

The preparatory work for the formation of the Hong Kong Flying Club had been done very largely by Mr. Vaughan-Fowler whose unbounded enthusiasm and wide experience as an aviator had enabled them to present such an attractive scheme.

The Hon. Mr. W. E. L. Shenton, the first Wing Commodore and President of the Club, then outlined the constitution of the Club. He said that the objects of the Club were to teach the principles of flying, to offer the Government trained pilots and engineers in the event of an emergency, to gain aerial experience by the formation of a flying section and to offer facilities for sport and social intercourse.

The Club would be registered with limited liability on the lines of other Clubs in the Colony and the membership would be irrespective of nationality, being subject only to the votes of the members of the committee. There would be flying members, subscribing or associate members, and honorary members.

The first-named would pay a larger entrance fee and subscription and would be called upon to sign a declaration. This was in consideration of the financial assistance received from the Government and was similar to that adopted by other flying clubs. It provided that in the event of the Governor declaring a state of emergency, a flying member placed his services at the disposal of the Government. The Government intended to give special facilities to members of the Hong Kong Volunteer Defence Corps who would be given free instruction in aviation on terms to be decided by the Governor.

The following were then elected members of the General Committee and authorised to proceed with the organisation of the Club.

Wing Commodore.—The Hon. Mr. W. E. L. Shenton.

Naval Representative.—Lt.-Commander W. B. Keith, R.N.

Military Representative.—Capt. K. V. B. Benfield, D.S.O., M.C. (G.S.O. III. China Command).

Royal Air Force.—Wing Cdr. A. H. S. Steele-Perkins, O.B.E., R.A.F.

Government Representative.—Commander G. F. Hole, R.N. (retired).

Honorary Secretary.—Mr. A. W. Summers.

Honorary Treasurer.—Mr. A. Ritchie.

Club Captain.—Mr. E. I. Wynne-Jones.

General Committee.—Mr. R. Vaughan-Fowler.

AVIATION IN MACAU.

Valuable work in spreading the Gospel of Aviation in the Far East is being done by the small detachment of Portuguese Naval Aviation in Macau. This detachment under Commandante J. Cabral of the Portuguese Navy was equipped some time ago with Fairey III.Ds. one of which was the old original III.D (Rolls-Royce Eagle) with which the late Commander Sacadura Cabral and Captain Gago Coutinho completed their flight across the South Atlantic.

The Portuguese Naval officers at Macau often fly to Hong Kong to visit the R.A.F. Station there, and the meetings are mutually appreciated. Also the R.A.F. have several times flown to Macau.

The Governor of Macau, Senhor Tamaguini Barbosa, and the Governor of Hong Kong, Sir Cecil Clementi, are both very keen on flying and both of them have flown in the Portuguese Naval machines at Macau. When the Governors of Colonies set such an example the result is bound to be all for the good of the progress of aviation.

SIR SAMUEL HOARE.

The Rt. Hon. Sir Samuel Hoare, who was Secretary of State for Air in the last Government, has been appointed Treasurer to the Conservative Party.

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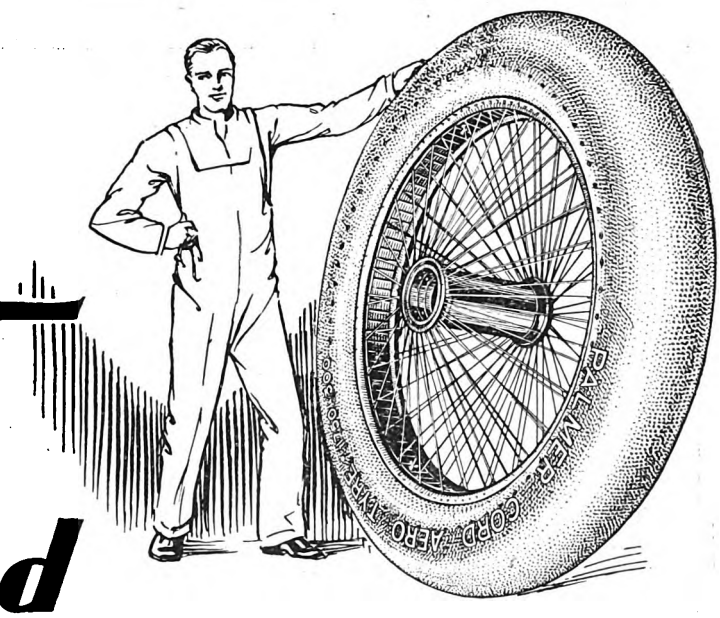
Look at this big fellow—



—and this little one

STANDARD SIZES

Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m			m/m	m/m	m/m			m/m	m/m	m/m
375 × 55	168	111·12	25·4	Central	700 × 100	176	178·	44·45	Central	1000 × 180	148	220·	80·	Central
,,	195	130·	38·09	Central	,,	179	178·	55·	132/46	,,	149	185·	55·	Central
										,,	155	220·	66·67	Central
300 × 60	16	111·12	25·4	Central						,,	166	185·	55·	125/60
					650 × 125	119	178·	55·	132/46					
450 × 60	30	89·	31·75	Central	,,	147	178·	55·	Central	900 × 200	107	185·	55·	Central
,,	172	130·	38·09	Central	,,	188	120·	34·92	Central	,,	108	185·	55·	125/60
					,,	336	178·	44·45	132/46	,,	128	220·	66·67	Central
575 × 60	21	160·	28·	Central						,,	137	250·	80·	Central
,,	180	150·	38·09	104/46						,,	157	185·	80·	Central
,,	186	120·	34·92	Central	750 × 125	77	178·	44·45	132/46	,,	202	185·	60·32	Central
,,	190	150·	38·09	Central	,,	92	185·	55·	135/50					
					,,	95	185·	55·	Central	1100 × 220	134	220·	66·67	Central
600 × 75	21	160·	28·	Central	,,	99	178·	38·89	132/46	,,	136	250·	80·	Central
,,	180	150·	38·09	104/46	,,	112	150·	38·09	Central					
,,	186	120·	34·92	Central	,,	176	178·	44·45	Central	975 × 225	192	185·	60·32	Central
,,	190	150·	38·09	Central	,,	179	178·	55·	132/46	,,	194	185·	55·	125/60
										1100 × 250	384	220·	60·32	Central
700 × 75	78	178·	44·45	132/46	800 × 150	161*	185·	55·	135/50					
,,	79	178·	44·45	Central	,,	162*	185·	55·	Central	1250 × 250	314	250·	80·	Central
,,	100	178·	38·09	132/46	,,	163*	185·	66·67	135/50	,,	154	304·8	101·6	Central
,,	101	178·	31·75	132/46	,,	169†	185·	55·	135/50					
	196	178·	55·	Central	,,	177	185·	55·	135/50	1500 × 300	305	304·8	152·4	Central
					,,	183	185·	55·	Central	,,	306	304·8	101·6	Central
600 × 100	188	120·	34·92	Central	,,	211*	185·	60·32	135/50					
,,	304	150	38·09	104/46						1525 × 325	197	304·8	101·6	Central
,,	333	120·	34·92	Central										
					1000 × 150	167	185·	55·	125/60	1750 × 300	139	400·	152·4	Central
700 × 100	77	178	44·45	132/46	,,	174	250·	80·	Central	,,	191	350·	150·3	Central
,,	92	185·	55·	135/50	,,	182	185·	55·	Central					
,,	95	185·	55·	Central	,,	187	220·	66·67	Central	1750 × 350	193	400·	125·	Central
,,	99	178·	38·89	132/46	,,	201	185·	60·32	125/60					
,,	112	150·	38·09	Central	,,	210	185·	60·32	Central	2000 × 450	363	500·	152·4	Central

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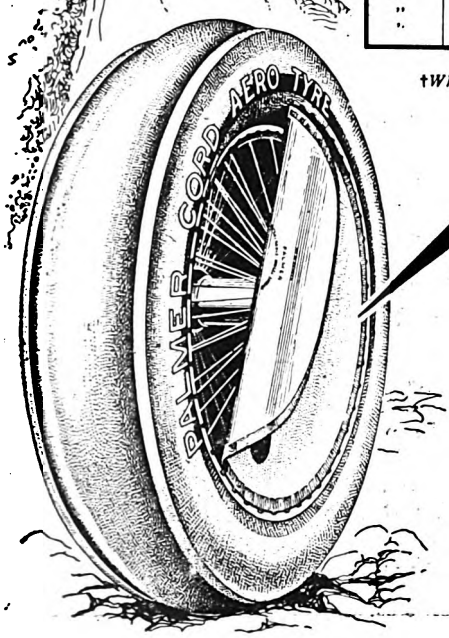
†Wheel No. 169 is fitted with Ball Bearings. Grease gun equipment is now a standard fitting on all wheels.



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THE LIGHT AEROPLANE
AND THE FLYING CLUBS.

THE MARK III MOTH.

For some considerable time the fact that the De Havilland Aircraft Co. Ltd. had designed and built an entirely new light aeroplane to be known as the Moth III, has been an open secret. The experimental model has been flying for several months and the public character of Stag Lane aerodrome has prevented the preservation of that secrecy which is so desirable when constructing firms are trying out a new type.

A reference to the Moth III or D.H.80 has now appeared in the daily press so that no good can be served by further reticence on the part of THE AEROPLANE.

Although the D.H.80 is called a Moth it bears no resemblance at all to its famous progenitor. It is a high-wing monoplane seating two, or an occasional three, in a comfortably furnished cabin. The outstanding features of the machine are its amazingly good view all round and its very high performance,—for both of which qualities the inverted Gipsy engine is accountable. Otherwise, in general arrangement it follows the lines of the Hawk-Moth.

The wings, of wood, are arranged to fold and are hinged to the top fuselage longerons and braced to the bottom longerons by steel tube Vee struts. The fuselage is a steel tube structure and the upper half of the forward or cabin section consists almost entirely of windows.

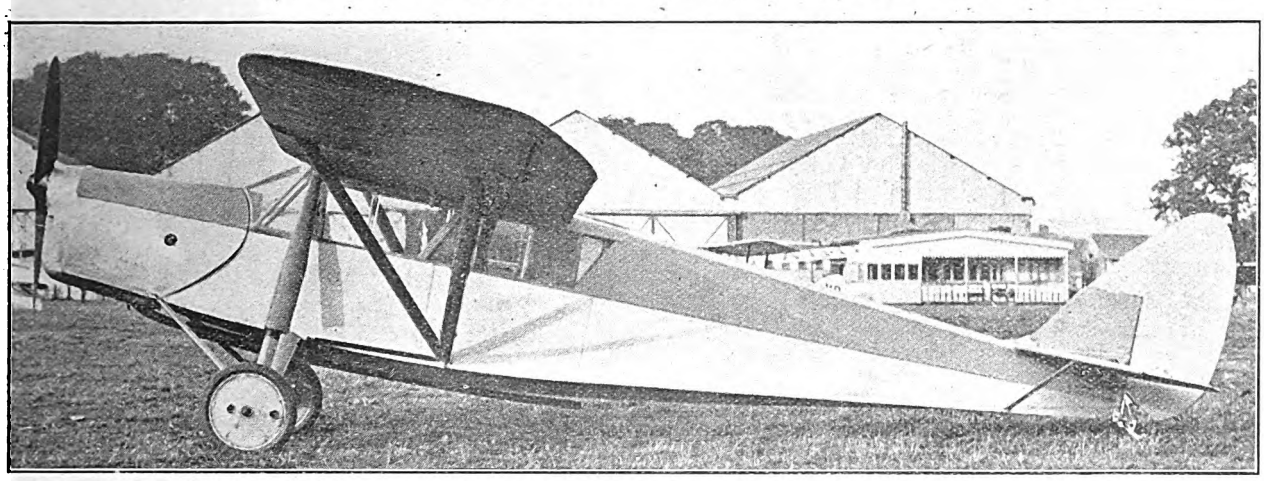
The engine is a new model inverted Gipsy rated at 115-120 h.p. This engine puts an entirely new interpretation to the expression "good view." From the sloping windscreen forward of the cabin the nose cowling slopes away to the air-screw boss without a single obstruction. The in-line arrangement of the engine permits of a very narrow nose, so that the forward view is as near perfect as is possible on a tractor aeroplane, and is much better than that provided in the modern automobile.

The roof of the cabin is made up of transparent panels right to the back wall, and the sides consist of openable windows.

The interior furnishing of the cabin has been carefully studied, although the final arrangements will not be known until the production machines are coming through. Ample luggage space is also provided. The cabin of the production type will be widened slightly and this extra width will allow the use of two staggered seats aft of the pilot's seat, if he or she wants to carry two passengers.

The undercarriage is of the wide divided type. The main spring legs are attached to the top longerons at the points of attachment of the front wing-spar fittings and their bottom ends are hinged to the bottom of the fuselage by steel tube Vees.

An ingenious form of air-brake is incorporated in the undercarriage. The fairing of the spring legs may be turned through an angle of 45 degrees and the presentation of the flat side of the fairing to the air-stream provides very effective air braking. The exact braking effect in miles per hour is not yet made known.



THE LATEST MOTH.—A side view of the Moth III (D.H.80) in its experimental form.—("Aeroplane" photograph.)

The Moth III has not been produced to replace the Gipsy-Moth but is intended to be a sports model of the De Havilland range of light aircraft.

The experimental machine has a top speed of somewhere around 125 m.p.h. and it cruises at over 100 m.p.h. These figures will be reproduced and probably augmented in the production type.

A first batch of thirty-five has been laid down and deliveries for these will begin in June. Practically all these machines have already been sold and a further batch is being put in hand. The price of this new type will be £1,000.

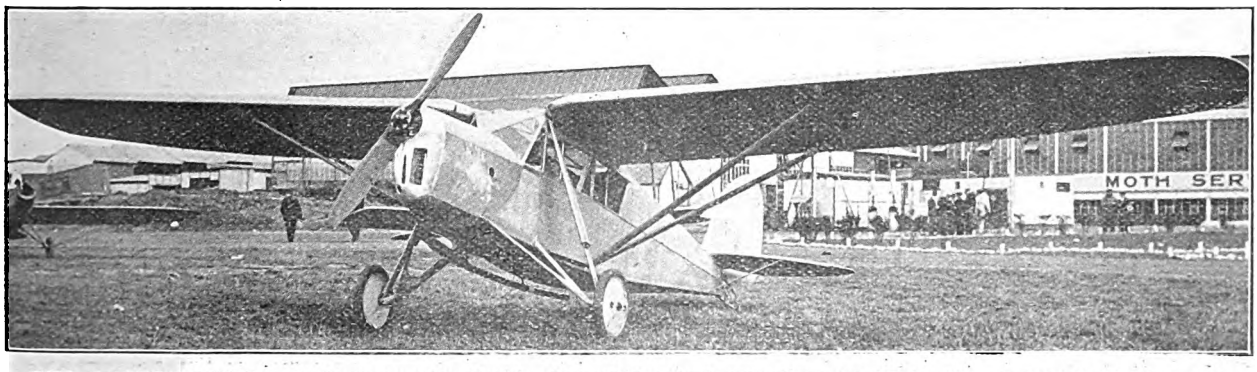
THE ASHWELL-COOKE CUP.

The first competition for the Ashwell-Cooke Challenge Cup was held on Feb. 2, at Lympne. There were five competitors, only one of whom came from outside. The other four were members of the Cinque Ports Club.

The competition resulted in a draw between the Hon. David Tennant and Mr. H. Calvert, each of whom scored 89 marks. The next was Mr. Dallas Brett with 74.

Mr. Tennant was taught at the D.H. School. He was flying his slotted Cirrus-Moth G-EBZP. The four Lympne entrants flew the Club Moth, G-EBPM (Cirrus II engine).

The Cinque Ports seem to be very lucky. They have received another silver Challenge Cup. This has been presented by Mr. Clayton Rickard, of Hythe.



THE LATEST MOTH.—A three-quarter front view of the first experimental Moth III or D.H.80 light cabin monoplane (inverted Gipsy engine). The production model will differ only slightly from this machine in appearance.—("Aeroplane" photograph.)

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This Cup will be awarded to the Competitor, the aggregate of whose best three scores for the Ashwell-Cooke Cup shall be the greatest for the year ending Feb. 2, 1931.

The next competition for the Ashwell-Cooke Cup will be on March 2, the first Sunday in the month. The Club hopes that members of other clubs, encouraged by the success of the only visitor at the first competition, will turn up in force.

As a result of experience gained on Feb. 2, the Rules will be modified. Competitors will climb to 1,000 ft. instead of 500 ft. They will throttle back their engines as nearly as possible immediately above the mark on the aerodrome. This will prevent a straight approach.

Competitors using slots will be handicapped five marks from their total score. The distance allowed for run after landing will be 75 yards instead of 50 yards. Competitors will only be penalised when they exceed this distance.

MR. CHICHESTER NEARS HOME.

Mr. F. C. Chichester arrived at Fanny Bay Aerodrome, Port Darwin, Australia, on Jan. 25. He had flown from Batavia by way of Sourabaya to Atambau, where he stopped a day to overhaul the engine.

Thence he flew to Port Darwin by way of Melville Island. He left for Sydney on Jan. 26, and reports dated Jan. 27 announced his landing near Camooweal on Jan. 26.

On the afternoon of Jan. 28 Mr. Chichester arrived at Longreach. He explained to people there that he lost his way after leaving Darwin. He therefore landed by an artesian bore, and camped there for the night.

In the morning, as he had only three gallons of fuel left, he decided to take-off and fly for fifteen minutes. If at the end of that time he failed to see any signs of life in the country below he would return and land by the well. After fourteen and a half minutes in the air he saw Rocklands Station, near Camooweal.

Mr. Chichester reached Mascot aerodrome at Sydney on the afternoon of Jan. 30.

Mr. Scullin, who is Prime Minister of the Commonwealth, has sent Mr. Chichester a message of congratulation.

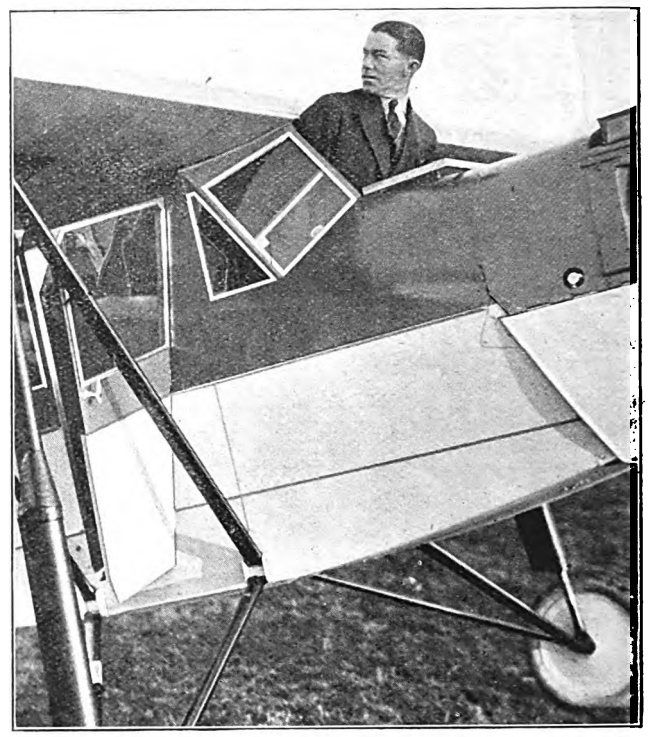
Lord Thomson, Secretary of State for Air, has sent the following telegram to Mr. F. C. Chichester:—"Air Council tender warm congratulations on successful completion of your fine flight to Australia."

FLIGHTS TO EGYPT.

The Aeroplane of Jan. 22 contained the report of the start of Sir Ahmed Hassanein Bey for Egypt.

He reached Marseilles safely on an unknown date and left later for Pisa, where he crashed on landing.

BUSINESS IS BUSINESS.—Mr. S. A. Thorn, of Cirrus Engines, Ltd., with his Avian (Cirrus-Hermes), which does 123 miles per hour.



WHIP BEHIND.—Mr. J. J. Flynn, of N.F.S., demonstrating the new folding windscreen on the Desoutter monoplane (Cirrus-Hermes) which allows the pilot to see behind before taking-off.

Meanwhile on Jan. 25 Mahmoud Sidky Effendi reached Cairo, whither he had flown from Berlin, which he left before Christmas. No details of the flight or of the machine other than it was of 40 h.p. are available.

Sidky Effendi won the prize of £500 which had been offered to the first Egyptian to fly from Europe to Egypt. This had been offered to encourage national aviation in Egypt.

This successful flight aroused great enthusiasm locally and large crowds are reported to have thronged the R.A.F. aerodrome. Afterwards a great triumphal procession was made to Cairo, five miles away.

Considering that our aviators look on Egypt as a way-station on the route to the East, and as a point *after* which the real flying starts, all this jubilation seems rather a confession of weakness by people who claim to be politically and legally on equal terms with Europeans.

AN ITALIAN GIPSY TOUR.

Signor Mario Rasini, *un "gentleman" italiano*, and member of the Aero Club "Emilio Pensuti" of Milan, and a mechanic, Pietro Giorgetti, have recently completed a tour round the Mediterranean in a Breda 15 two-seat light cabin monoplane (D.H. Gipsy engine).

He left Milan on Dec. 16 and flew by way of Naples, Catania, Tunis, Tripoli, Agedibir, Aboukir, to Cairo. From here he flew back along the north coast of Africa over Libya, Tunisia and Morocco, and thence by way of the east coast of Spain, and the south coast of France.

When flying along the Italian Riviera he was caught by a particularly boisterous wind gust and forced to land near Noli, and the machine was very slightly damaged. The field in which he landed was too small for him to fly out, so he folded the wings of the Breda and had it towed to the nearest railway station for transport to Milan.

Throughout the flight he had no mechanical trouble of any kind in spite of unfavourable weather conditions.

HOME TO BAGHDAD.

An 'Iraqi pilot, Mr. Salim Sassoon Daniel, has just successfully flown in his Moth from England to Baghdad. He holds a British "B" pilot's licence, which enables him to fly commercially, and he is, in fact, the only 'Iraqi to hold such a licence. He is also the first 'Iraqi private owner.

Mr. Daniel was taught to fly in 1927 by Lt. Col. Henderson. Mr. Daniel is an oil-mining engineer and is now thinking of enlarging his activities by starting a Moth taxi-service in 'Iraq, which he proposes to run in conjunction with his engineering duties. He is 27 years old.

ANOTHER MISS.

On Feb. 3 Man Mohan Singh made a forced landing on a hillside near Cosenza, in the Italian Province of Calabria. This Province forms the instep if one regards the lower part of Italy as a foot.

The machine, *Miss India*, is reported to be badly damaged but Man Mohan Singh was only slightly hurt.

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MOTHS IN AUSTRALIA.

Lady Somers, wife of H.E. the Governor of Victoria, has taken delivery of a standard metal Gipsy-Moth from the De Havilland Aircraft Proprietary Ltd. of Melbourne. Her pilot will be presumably Flt. Lt. Denny, R.A.F., A.D.C. to the Governor.

Mr. F. K. Bardsley, of Cronulla, N.S.W., has acquired a Tiger-Moth through the Australian D.H. branch, and this machine was due for delivery before Christmas.

A firm known as Seaplanes Ltd., of Perth, W.A., has ordered two Hawk-Moth cabin seaplanes (Armstrong Siddeley Lynx engines). A third machine of this type has been shipped from England for demonstration purposes to De Havilland Aircraft Proprietary Ltd.

ARISTOCRATIC MOTHS IN FRANCE.

The Baron de Précourt took delivery of his Gipsy Moth at Stag Lane Aerodrome on Jan. 31 and set off to Paris. The Baron is well known in French aviation circles and is a director of the Schreck Aeroplane Company and the owner of a Schreck flying-boat and a Morane monoplane.

Moths have already been supplied to the Vicomte de Sibour and the Comte de Beauregard. And a Moth is on order for the Comte de Villefranche.

Full Moth service facilities exist near Paris at the premises of Aeroplanes Morane-Saulnier, who build the Moth under licence.

BRITISH AIRCRAFT IN AUSTRIA.

Though British aircraft have been supplied in fair quantity during the past few years to nearly every European country, only recently has Austria been included. The use of aircraft is very much in its infancy in Austria, and is not nearly so advanced as in, say, Germany. The De Havilland Aircraft Company Ltd. has therefore lately turned its attention to the Austrian market. The company will soon be represented in Austria, and full service facilities will be available for Moth users.

A Moth has just been bought by Ingenieur Nikolaus Eltz, a well-known all-round sportsman, and it is hoped that his example will stimulate the use of British aircraft in Austria. Also, a Moth was supplied last year to the Viennese correspondent of *The Chicago Tribune*, who is himself a pilot of many years' standing. This Moth has given invaluable service and has been flying continuously all over Europe.

THE AMPHIBIAN CUTTY SARK.

On Feb. 1, the Saunders-Roe Cutty Sark Amphibian (two Cirrus Hermes engines) arrived at Lympne from Martlesham. Mr. John Lord was on board, with Flt. Lt. Scott as pilot. This is the machine which has been ordered by the Matthews Aviation Co., of Essendon, Melbourne, for their service to Tasmania across the Bass Strait.

A number of the members of the Cinque Ports Club were taken up. They were much impressed by the comfort of the cabin. One understands however that the mode of ingress and egress from the cabin is not too easy from the ground.

As this was designed for entry from the water, or at least when the Cutty Sark is waterborne, this is understandable. There is no doubt that Saunders-Roe, who have incorporated so many excellent qualities in the Cutty Sark, will be able to provide a comfortable mode of ingress or egress for use on land.

THE FIRST PARACHUTE DROP INTO BROOKLANDS.—From left to right: Mr. Dudley Watt, Mr. A. de C. A. Squarey and Mr. Jack Oliver of the D.W. Aircraft Co. The parachute is a standard back type Russell Lobe Chute.

BIG GAME PHOTOGRAPHY.

An interesting trip to Kenya has been planned by Lieut.-Comdr. Glen Kidston, R.N. He intends to photograph big game from the air. His Moth, G-AAJV, has been shipped to Aboukir, whence he will fly south to Kenya. G-AAJV has a small Eagle camera, and a special silencer has been fitted to deaden the sound of his engine, so that the animals may not be prematurely startled. Lt.-Comdr. Kidston has now quite recovered from his crash in the Junkers.

A RANGOON FLYING CLUB.

At a meeting held on Dec. 2, 1929, in Rangoon, those present decided to form a Flying Club and to elect office-bearers as soon as the membership reached a certain figure.

His Excellency the Governor of Burma, Sir Charles Innes, has consented to become the Patron-in-Chief of the Club. Suitable premises are being tentatively arranged,—attached to which will be tennis courts and other sports facilities.

A SPANISH AWARD.

The International Jury of the Barcelona Exhibition has conferred the Grand Prix of its category on the Caproni 100 T light biplane, which was shown in the Aircraft Section of the Exhibition during last summer and autumn.

The design of the Caproni 100 T light aeroplane is based on that of the D.H. Moth, to which it is very similar in appearance. The standard engine for this type is the D.H. Gipsy.

THE CINQUE PORTS CLUB.

The Club manages to get remarkably low petrol consumption from its engines. The figures for December on the Cirrus II engine in G-EBPM were 3.511 gallons per hour. For January the figures were 3.754 gallons per hour. These figures are surprisingly good.

NOTICE TO STAG LANE AVIATORS.

The De Havilland Aircraft Co. Ltd. has instituted a Rumble Club at Stag Lane Aerodrome and a list of fines has been drawn up which will range from one penny to five shillings.

Mr. Ronald Malcolm, whose office is in the Moth Show Room on the edge of the aerodrome, is installing the necessary equipment for the observation of misdemeanours. Equipment will include a wide-angle telescope and cash register.

During the wet season it will be left to the Scrutineer to decide whether conditions call for land or marine procedure and etiquette when landing or coming alongside. When possible Mr. Malcolm will wear the appropriate dress.

The following are the regulations of the Club which come into effect immediately.

THE STAG LANE RUMBLE CLUB.

The following expositions of how not to fly are considered Crimes by the above Club, and will in future render the offender (at Stag Lane Aerodrome) liable to the payment of fines, as under:—

1. One "Common Rumble," 1d.
2. One "Bounce" (each consecutive bounce to be charged for at a rising scale of double, viz., 6d. 1s., etc.), 3d.
3. One "Rumble" and "Bounce," 4d.
4. One "Humble (or surreptitious) Rumble" (sometimes known as a "Thumbed-in" landing), 3d.
5. Using more than half the aerodrome, 2d.
6. One "Bailham" landing (rumble, bounce, engine, and another bounce), 6d.
7. One "Super Bailham" (the above, followed by another circuit), 1s.
8. One "Cobley" (approaching below aerodrome level, and rumbling over hedge), 3d.

8a. The above, fitted with bounce, 1s.

9. One "Bengal Bounce" (dropping m/c from several feet), 6d.
10. One "Cisslip" (sideslip followed by rumble), 6d.
11. One "Highland Taggle" (landing down wind), 2s.
12. One "Wolly" (stick in the mud, and needing assistance), 1s.
13. One "Stoppage" (losing prop.), 1s.
14. One "Ass's Bray" (damage to m/c taking off), 2s.
15. One "Hamhandle" (excessive pump-handling), 6d.
16. One "Complete Basket" (breaking m/c with bad landing), 5s.

Ladies half-price.

All instructional flying is exempted from the above penalties.

The Club also intends to levy the following fines for breaches of aerodrome etiquette as under:—

1. An act of "Cleavage" (wearing flying hat more than 5 mins. after landing), 1s.
2. Committing "Periwinkle" (being importantly concerned in aviation and using aerodrome, although never by any chance flying), each appearance at aerodrome, 1s.
3. Committing a "Lympoon" (arriving at aerodrome other than by air, with a flying hat on), 3d. (Extra charge of 1d. for Goggles.)

The proceeds will be handed over to the De Havilland Sports Club.

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GLOSTER

The Pioneers of Steel Aircraft and Variable Pitch Propellers.

["Flight" Photograph.

GLOSTER A.S.31 IN METAL.

FOR SURVEY AND PHOTOGRAPHIC WORK.

Designed and built by the Gloster Aircraft Co., Ltd. As used by the Aircraft Operating Co., Ltd.

"The first British aircraft to have been designed efficiently to meet the exacting requirements of the air surveyor working over the undeveloped lands of Empire."—THE TIMES.

GLOSTER AIRCRAFT CO., LTD.,

SUNNINGEND, CHELTENHAM.

GLOSTER WORKS AND AERODROME,

BROCKWORTH, GLOS.

THE STEEL WING Co., Ltd.

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Following the successful conclusion of the **R.A.F. FAR EAST FLIGHT OF 27,000 MILES** in four Supermarine "Southampton" Flying Boats,

THE SUPREMACY OF "SUPERMARINE"

DESIGN AND CONSTRUCTION

HAS AGAIN BEEN DEMONSTRATED BY SUPPLYING AIRCRAFT TO RETAIN THE

INTERNATIONAL SCHNEIDER TROPHY

Previously won by Supermarine, and to create a new

WORLD'S SPEED RECORD OF 357.7 M.P.H.

The valuable experience gained in the attainment of these

OUTSTANDING SUCCESSES

is incorporated in the production of multi-engined Marine Aircraft of Monoplane and Biplane Types of 14 passenger carrying capacity which are now being constructed.

PARTICULARS OF NEW TYPES

of Passenger and Freight carrying Flying Boats are available on request. Advance designs of new service types of All Metal Flying Boats are in course of preparation.

Consecuencia del éxito afortunado del **VIAJE AL EXTREMO ORIENTE DE 27,000 MILLAS** por la Fuerza Aérea Británica con cuatro botes voladores Supermarine "Southampton."

LA SUPREMACIA DEL HIDROAVION "SUPERMARINE"

como diseño y construcción ha sido una vez más claramente demostrada por el hecho que hemos podido suministrar el aparato capaz de retener la

COPA INTERNACIONAL SCHNEIDER

conquistada precedéntemente por la Supermarine y de alzar el RECORD MUNDIAL DE VELOCIDAD AL PROMEDIO FORMIDABLE DE

575,700 KM. POR HORA.

La experiencia valiosa obtenida por la preparación de estos triunfos sensacionales queda utilizada en la construcción de hidroaviones multi-motores de los tipos monoplano y biplano, con posibilidad de acomodar 14 pasajeros. Dicha construcción está ya iniciada.

Tendríamos mucho gusto en dar a Vd. detalles sobre los nuevos tipos de hidroaviones tipo bote para el transporte de pasajeros y mercancías.

Estamos preparando los dibujos preliminares para nuevos tipos de hidroaviones tipo bote, enteramente metálicos, para el servicio militar.

Suite de la conclusion heureuse du **VOYAGE A L'EXTREME-ORIENT DE 27,000 MILLES** par la **"ROYAL AIR FORCE"** avec quatre hydravions à coque Supermarine "Southampton."

LA SUPREMATIE DE L'HYDRAVION "SUPERMARINE"

comme dessin et construction

a de nouveau été démontrée par le fait que nous avons pu fournir l'appareil qui a

pu retenir le

TROPHEE INTERNATIONAL SCHNEIDER

gagné précédemment par la Supermarine et d'élever

LE RECORD DU MONDE DE VITESSE A LA FORMIDABLE MOYENNE DE 575,700 KM. A L'HEURE.

L'expérience précieuse obtenue en achevant ces succès éclatants est utilisée pour la construction d'hydravions multimoteurs des types monoplan et biplan pouvant accommoder 14 passagers. Cette construction a déjà commencé.

Nous serions heureux de vous fournir des détails au sujet des nouveaux types d'hydravions à coque pour le transport de passagers et de marchandises.

Nous préparons les dessins préliminaires pour de nouveaux types d'hydravions à coque, entièrement en metal, pour des buts militaires.

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COMMERCIAL AERONAUTICS.

THE TRAILING AERIAL.

This, from a correspondent at Washington, will please our wireless experts:—

I have just heard a story that should delight you. Been visiting with C. Francis Jenkins, the inventor of the original movie camera, and some 400 other things, including radio movies, radio weather maps, radio altimeters, true ground speed indicators, etc. His latest is the Jenkins antenna for radio reception and transmission from an unshielded airplane.

Says Jenkins, to himself, every airplane is required by law to have a fireproof bulkhead between pilot and engine. Therefore the bulkhead should act as an electrical shield, and we might expect to find behind it an electrical "dark spot" in the shape of a cone extending aft from the bulkhead, within which zone there should be no interference.

So he ordered the shop to build up a self-contained transmitter and receiver, loaded it into his Stinson cabin ship, told the operator to tie a handkerchief on the end of the antenna, and when they got off the ground, to throw the wire out of the window. The wire whipped straight aft, the operator tuned in the Jenkins broadcast station, and they proceeded to carry on two-way conversation without any interference from the motor.

From as far away as Philadelphia Jenkins, using a combined receiver-transmitter weighing, with all batteries, only 26 pounds, was able to call his station here, have them get Mrs. Jenkins on the 'phone, and talk to her from the 'plane.

Next they demonstrated to the Navy, and then borrowed a tri-motor ship, and found that the wing motors did not cause interference because the nacelle fairing acted as a shield. The army radio ship now en route to the coast with the first pursuit squadron is using the trailing antenna, with a one foot long wind-sock to keep it taut.

On Jenkins' own ship the wire leads aft from a reel clamped at the window, through a short length of Bakelite tubing attached beside the navigation light on the rudder.

Rather amusing that for years the Powers that Be have been designing bigger and better lead fish to drag the antenna down just where it should not be, and then fighting to shield the motor and cut out the ignition disturbance.

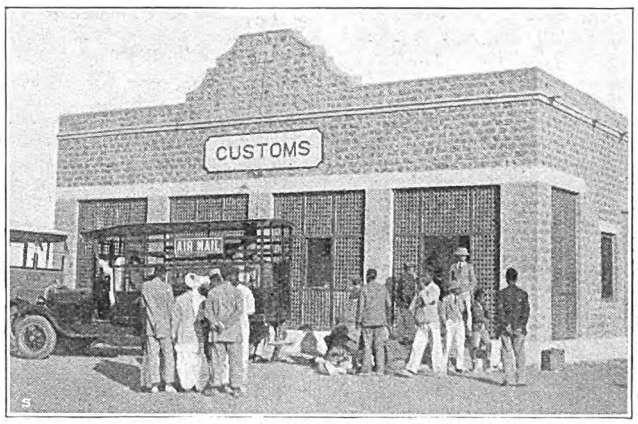
Although Jenkins is 62, he is his own pilot, and quite active.

[One knows nothing of radio work. And though the story comes from Washington it comes from the City, D.C., and not from George. So radio experts can do what they like about it.—C. G. G.]

A REDUCTION OF CROSS-CHANNEL INSURANCE.

Imperial Airways, Limited, announce that the insurance rates for goods despatched to the Continent on Handley Page air-freighters will be reduced by nearly 70 per cent. next month.

In some cases the rates are below those for goods sent by boat and train. From London to Leipzig the rate has been reduced from 6s. 6d. per cent. to 1s. 6d. per cent.



ENTERING THE INDIAN EMPIRE.—The Custom House at Karachi.

WILSON AIRLINES LTD.

The sole financial interest in Wilson Airlines Ltd. of East Africa is vested in a woman, Mrs. Wilson, widow of a prominent Kenya settler. Mrs. Wilson exercises a large measure of executive authority in the running of the air lines, and herself invariably travels by air. Some while ago Wilson Airlines acquired a Moth to augment their fleet, and now an order has been received for a special coupé Moth for Mrs. Wilson's personal use.

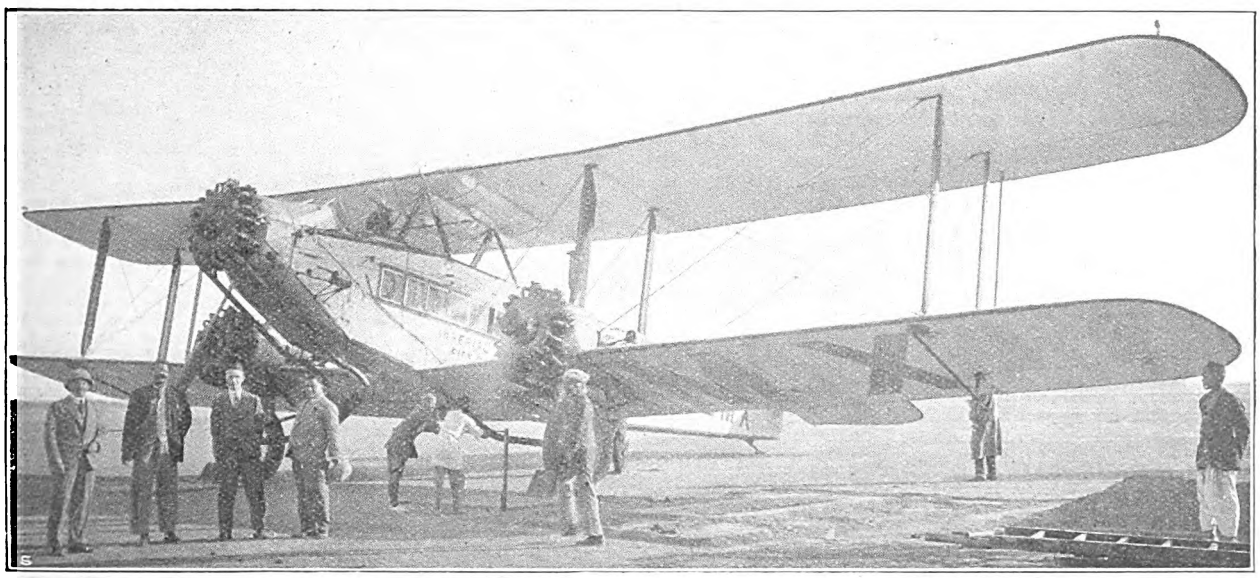
Mr. T. Campbell Black is the Managing Director of the firm and is a well-known figure in African aviation. Among the many flights which he has made between Africa and England was one in a D.H.51, the occasional three-seater type which was, incidentally, the direct forerunner of the Moth.

Mr. Black recently made a pioneer trip in the Moth belonging to Wilson Airlines Ltd. from Nairobi to Mombasa. This is a distance of only 330 miles, but interest lies in the fact that there is not a single aerodrome or possible landing-ground anywhere en route. Mr. Black's intention was to prove to the public of East Africa that a business man living in Nairobi can visit the coast, put in a day's work and then return to Nairobi the same day. Using the Kenya and Uganda Railway the return trip takes nearly 48 hours.

THE NEIGHBOURHOOD OF CROYDON AERODROME.

Information has been received that the land on the east side of Purley Way, facing the London Terminal Aerodrome at Croydon, has been bought by the Croydon Corporation from the Ecclesiastical Commissioners to be laid out as playing fields. That part of it opposite the premises of A.D.C. Aircraft Ltd., and immediately behind the pumping station, is to be developed as part of the Waddon housing estate.

Efforts were made to get the Air Ministry to buy that



THE INDIAN AIR MAIL EXTENSION.—The first De Havilland Hercules (three Bristol Jupiters) starting from Karachi for Delhi.

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part of the frontage facing the aerodrome, but the Exchequer would not sanction the deal. There seems to be, however, a mutual understanding between the Air Ministry and the Corporation that buildings on that particular part of the land will be limited, so as not to interfere with the landing of aeroplanes to the south of the Control Tower,—where, except for the recognised landing gap between the hotel and the A.D.C. sheds, is about the only part left unobstructed by the foolish people who built the sheds and and Control Tower and the hotel just exactly where machines would want to come in to land.

Apparently the Ecclesiastical Commissioners have reserved a small plot of land on which to build a church whenever they want to do so. One can only hope that they will not select their plot and build a church with a high spire midway between the Control Tower and the top of the hill. What with the chimney of the pumping station and the Control Tower itself and the church spire the hazards of landing in thick weather at Croydon would then become unreasonable.

THE 1929 RECORD OF K.L.M.

K.L.M., or Royal Dutch Air Lines, as they are less familiarly called, use three types of machines over their European and Eastern Routes. These are all Fokkers, and their records for the past year make interesting reading.

The first type is the F.VIIa, which has one Gnôme-Rhône Jupiter engine. These machines in 1929 flew 5,246 hours, a reduction of 348 hours over the total for 1928.

The F.VIII have two Gnôme-Rhône Jupiter engines. These machines have flown 3,516 hours in 1929, a reduction of 53 hours over the amount for the previous year.

The F.VIIb3m have three Gnôme-Rhône Titan engines. These machines in 1929 flew for 3,161 hours, an increase over the previous year of 2,623 hours.

Thus the total flying time for 1929 shows a big increase over that for the previous year.

In 1929 the Jupiter engines Series IV have run for 4,132 hours, a reduction of 1,324 below the figures for 1928. The Series VI Jupiter engines have run for 9,568 hours, an increase of 963 hours over the previous year.

The total hours for both types of Jupiter engines in 1929 is 13,730 hours, as against 14,102 in 1928. This is offset by the large increase in hours flown by the Titan engines, which have a total for 1929 of 10,050 hours, as against 1,751 hours for 1928.

A very considerable amount of flying has been done on the service between Amsterdam and Batavia. This is a regular fortnightly service, and the four F.VIIb3m's have flown 1,389 hours on this route.

The distance between these two places is about 13,000 km. (8,080 miles). This distance has been flown 13 times with only one forced landing, which caused but slight damage, and delayed the mail five days.

Some trips have been made in eleven days, and in every case, with the one exception mentioned above, the mail has been delivered within fourteen days.

BEACONS FOR THE INDIAN ROUTE.

Two air beacons have been built to the order of the Air Ministry and are now ready for shipment abroad. These beacons, which are of the mobile type, are for the Cairo-Karachi section of the air-line to India. The lights can be used either for flood-lighting aerodromes or as beacons indicating the route or specific landing-grounds.

One can only hope that the pilots will not be dazzled by this display of energy and enterprise and generosity by the Air Ministry.

POSSIBLE PROGRESS.

According to the Bombay correspondent of *The Times*, Imperial Airways Ltd. are prepared to institute a regular air-mail between Karachi and Bombay as soon as the monsoon is over. There is to be no surcharge on letters sent by this route between these two cities.

The actual beginning of the service depends on two things. Firstly a suitable aerodrome must be found at Bombay. Secondly the public must promise its support. With this object in view the merchant firms are to be circularised and asked the estimated amount of mail that can be guaranteed.

This scheme is to be welcomed, and one hopes that the necessary support will be forthcoming, for under the present arrangements much of the advantage gained by flying from London to Karachi is lost by using the normal slow ground transport between Karachi and Bombay.

CUSTOMS IN NORTHERN IRELAND.

Air Ministry General Notice No. 4 of 1930 states that until a civil customs aerodrome is established in Northern Ireland, civil aircraft flying between Northern Ireland and the Irish Free State should land at and depart from Aldergrove, Royal Air Force, aerodrome, North of Belfast.

The customs aerodrome in the Irish Free State is at Baldonnell, County Dublin.

FRANCO-CANADIAN AIR OPERATIONS.

The *Compagnie Aérienne Franco-Canadienne*, the Canadian branch of the *Compagnie Aérienne Française*, has obtained a contract for the transport of mail between Oskelaneo and Chibougamou. Oskalaneo is on the Canadian National railway midway between Quebec and Cochrane.

The service will be weekly and the equipment to be used will be two Potez cabin monoplanes mounted on skis, which with the growth of the load of mail and freight will be replaced by Farman aircraft. In the summer when the lakes are free from ice Jupiter-engined Loiré-et-Olivier flying-boats will be used.

This is the first essay of the *Cie. Aérienne Franco-Canadienne* into the air transport field. They specialise on aerial photography, air survey and general, but not organised, transportation, in the province of Quebec.

During 1928 the company flew 668 hrs. of which 126 hrs. was on passenger-carrying, 288 hrs. on vertical and oblique photography, 12 hrs. on flying instruction, and 42 hrs. on other operations. 7,750 square miles were photographed, 53,440 miles were flown and 1,751 passengers were carried. For this work nine Schreck-F.B.A. flying-boats and seven pilots were employed.

Although the above figures are over a year old, no more recent official particulars are available. Nevertheless for last year it can be safely assumed that the figures will be superior to those quoted above.

THE AIR PILOT.

Air Ministry Notice to Airmen No. 3 of 1930 draws attention to Volume 1 of a new edition of *The Air Pilot*, which can be had from H.M. Stationery Office, or from THE AEROPLANE Book Dept., Cannon House, Pilgrim Street, London, E.C.4, price 12s. 6d.

This publication is divided into two parts, the first of which deals with Great Britain and Northern Ireland, the second with the Irish Free State.

The first part contains five chapters under the headings of General Information, Pilotage Directions, Meteorological Services, Radioelectric Services and Air Stations.

There are only three chapters in the second half. These are devoted to General Information, Pilotage Directions and Air Stations.

A HAPPY RELEASE.

The Madrid correspondent of *The Times* reports that the Ford all-metal Trimotor owned by the Spanish Air Monopoly Company flew on Jan. 10 from Seville to Madrid. The injunction against the machine obtained by the Junkers Company has now been withdrawn.

A BLIND CROSSING.

On Jan. 31 Mr. Youell flew from Paris to London in a thick fog. He left in bad weather and navigated by radio bearings. He made Croydon quite exactly after a flight of normal duration. Like the last trip of the R.100 this is a good example of the excellence of our system of radio-direction-finding.

A NEW LANDING "T" AT CROYDON.

Air Ministry Navigational Warning No. 3 of 1930 notifies the installation of an automatic illuminated landing "T" near the S.E. corner of Croydon aerodrome. The obstruction is marked with black and white flags by day and red lights at night.

Until the installation is complete the direction assumed by the "T" should be disregarded.

AIRPORT SERVICE.

All things in the States are not perfect,—nobody said they were,—and we ourselves, admitting our own imperfections, may find solace and amusement in the following letter from an experienced American pilot:—

Back to the subject of airports:—I have learned some more things since my last letter. Another amusing incident in regard to the Chicago Airport is this:—

A very good friend of mine, who was formerly an air mail pilot, landed there one beautiful clear night several weeks ago. No lights were lit on his arrival, and he taxied to the hangars on the South side of the field. He said that they were all lit up and the doors of some were open. There was a machine out in front with the motor idling, but no sign of life.

As it was very cold, he taxied in front of each hangar in turn and ran the motor. Still no sign of life. He then taxied all the way across to the other side of the field, about a mile, and repeated the same performance in front of the N.A.T. and Boeing hangars, and still no sign of life. He finally had to get out of the machine and go in to the back to the hangar and arouse some people to take care of him.

This is a great contrast to the Cleveland Airport, where they say the night mail pilots try their darndest to fool the man in charge of the lights. They will get up four or five thousand feet, turn their lights off, cut their motor, and try to sneak in on him, but he always catches them.

In regard to floodlights: they are now developing a light over here with the beam cut off in some way so that it only shows about four feet above the ground. This is not a serious height to land at, and on bad nights coming in, the pilots level off on top of the beam and drop through it. As they know the exact distance, by using the gun a little they can make a perfectly good landing.

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£735 THREE-SEATER BIPLANE Inter-changeable Wings.

Pilot and two passengers in complete comfort. "An Ideal Taxi-plane."
Dual Control can be fitted.

Aerobatic Certificate of Airworthiness
1,680 lbs.

BRITISH SPARTAN AIRCRAFT
Cirrus-HERMES-engine.
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High-performance sporting and training aeroplane. Full dual control.

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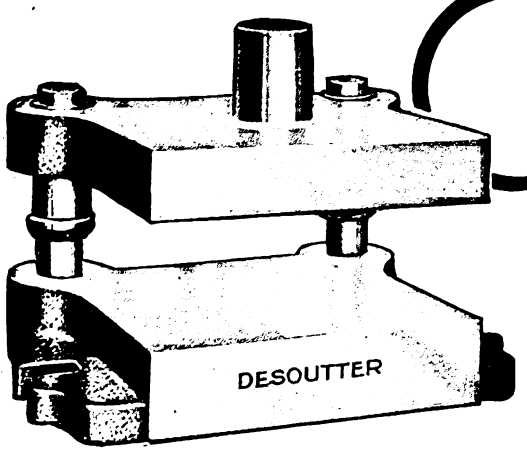

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CROYDON NOTES.

Mr. Armstrong, of Imperial Airways, who has been connected with Croydon Aerodrome as a pilot ever since the earliest days of civil flying, has left for Cairo where he will take up the appointment of (acting) Manager Near East Division for Imperial Airways. The appointment is, of course, permanent, but seems not to have been officially and formally confirmed yet, and the Editor is such a devil for meticulous accuracy of detail, that it is well to pander to him occasionally, so as to slip in a good hearty untruth unobserved some other time. Hence the wholly unnecessary word "acting."

Everybody who knows Mr. Armstrong will be extremely sorry to lose him, but will congratulate him very sincerely on his new job, which is of considerable and growing importance. They will also congratulate Imperial Airways in their choice of the right man for the right place.

This business of Air Superintendent for Imperial Airways is a bit baffling at times. Major Brackley was it for a long time, and still is really, but for many months Mr. Armstrong sternly occupied the official chair, and then one morning Mr. Wilcockson was there looking like Mussolini with a liver. Again, a few days later, the Air Superintendent was a positively monumentally portentous Mr. Walters. Maybe Mr. S. Robinson will occupy the sacred seat one day, and then—oh boy!

Mr. Wilcockson, accompanied by Mrs. Wilcockson, has taken a new D.H. Hercules to Cairo for Imperial Airways, and Mr. Donald Drew (old Uncle Ern Uskub and all) who took a Calcutta to Alexandria some time ago, is now on his way back with a Southampton.

Mr. Campbell Black left Croydon for Kenya Colony on Friday morning last with a tri-motor Avro Five for the Wilson Air Lines. St. Inglevert was up all the previous night firing Chinese crackers and gesticulating.

The real working R.A.F. officer, who does the flying, has no anti-commercial aviation complex, as we all know and as we abundantly proved when Mr. Horsey of Imperial Airways landed at Biggin recently with an Argosy and some passengers. Everything that could possibly be done for his passengers, his machine, his mechanic and himself, was done in the nicest possible way and the facilities of the whole place were put at his disposal.

Now shortly after the battle of Waterloo, when Spry, thanks to the activities of the local press-gang, was a-serving with the Colours, it used to be said that pigeon-witted officers whose unpleasant mentality made their Messes rise up and cast them forth, often went on the staff and thus legislated for the others, and that this accounted for the incredibly idiotic nature of Army Orders and what not. One does not know whether things have changed in these days but someone, presumably Staff, is responsible for the latest regulation regarding Civil machines landing at Biggin, the gist of which is as follows:

Commercial machines finding Croydon dud, and landing at Biggin must after disembarking passengers, leave that safe harbour where hangar accommodation, ample assistance and every facility exists, and proceed to Penshurst landing swamp, where there is one caretaker only, no accommodation of any kind, and where petrol can only be obtained in two-gallon cans from the local garage. If Croydon is still dud next day, passengers must be embarked for the Continent from Penshurst, presumably with the aid of a punt and a diving bell, in really wet weather.

What these Air Ministry experts who make such regulations do not get is that by compelling commercial machines to spend the night at Penshurst they endanger these machines for no good reason, as anyone thinking of the gales we have had this Winter will readily realise, and that to make a machine stay out all night in torrential rain or hard frost can scarcely be called good for it.

A regulation of this sort can only have been made in pure ignorance of conditions at Penshurst or on account of a strong desire to hinder and obstruct Commercial flying, which is difficult enough as it is in Winter, as Allah knoweth!

If, therefore, those Staff Officers of the R.A.F. will hold hard and rescind their regulation, Commercial Aviation will be grateful, and so one feels sure will our good friends at Biggin, who would hate to turn out a Commercial machine and pilot to die in the cold at Penshurst.

If you want an expert from the Royal Aircraft Establishment, Farnborough, for an important test, do not suggest doing it in the early morning. Experts may only leave Farnborough, it appears, by a 10.20 livestock and vegetable matter train on which fares are cheap

Should they appear earlier waving their warrants and try to jump a decent train, the Station Master is supposed to have plenary powers of incarcerating them in the lost luggage office until 10.19. Thus to the great glory of the Royal and Ancient Establishment, some sum such as 1¾d. per expert is saved and about a day's work is usually lost.—SPRY.

THE LONDON TERMINAL AERODROME.

ANALYSIS OF FIGURES FOR PAST WEEK.

Trips per Day.—Sunday, 7; Monday, 13; Tuesday, 13; Wednesday, 20; Thursday, 16; Friday, 17; Saturday, 19.

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London—Egypt—India: London—Le Touquet—Paris—Basle—Zurich: London—Ostend—Brussels—Cologne and return: Machines 34, passengers 169; freight 12½ tons. India Route: Inward, passengers 0, mail 583 lbs.; outward, passengers 0, mail 775 lbs.

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Paris—London: Machines 37, passengers 104, freight 7½ tons.

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SABENA:

Brussels—London: Machines 10, passengers 22, freight 2 tons.

DEUTSCHE LUFT HANSA A.G.:

Amsterdam—London: Machines 8, passengers 4, freight 1¼ tons.

MISCELLANEOUS:

British machines 4, passengers 8.
Foreign machines 0, passengers 0.

Total number of trips by British machines, 38, carrying 177 passengers. Foreign machines, 67, carrying 164 passengers.

COMPARATIVE FIGURES.

Week ending Feb. 1:
Machines, 105; Passengers, 341; Crews, 274; Total personnel, 615.
Corresponding week, 1929:
Machines, 71; Passengers, 234; Crews, 141; Total personnel, 375.
Corresponding week, 1928:
Machines, 96; Passengers, 299; Crews, 177; Total personnel, 376.
Corresponding week, 1927:
Machines, 64; Passengers, 151; Crews, 105; Total personnel, 256.
Corresponding week, 1926:
Machines, 57; Passengers, 122; Crews, 70; Total personnel, 192.
Corresponding week, 1925:
Machines, 59; Passengers, 86; Crews, 73; Total personnel, 159.
Corresponding week, 1924:
Machines, 69; Passengers, 103; Crews, 107; Total personnel, 210.
Corresponding week, 1923:
Machines, 50; Passengers, 144; Crews, 87; Total personnel, 231.
Corresponding week, 1922:
Machines, 54; Passengers, 92; Crews, 87; Total personnel, 179.
Corresponding week, 1921:
Machines, 22; Passengers, 25; Crews, 27; Total personnel, 52.

FLYING IN FOG.

Wireless direction-finding as a help to the navigation of aircraft again proved its value during the third test flight of the R.100 on Jan. 16.

The airship left its shed at 10.00 hrs. and did not return until about twelve hours later. The ship ran into thick fog an hour after leaving Cardington and did not get out of it until 20.30 hrs. Those on board could only get occasional glimpses of the ground, and did not know where they were until they had communicated with Croydon and Pulham by wireless for bearings to be taken on the direction-finders at these stations.

These direction-finders were supplied to the Air Ministry by the Marconi Company. They are known as the Type R.g.14 and are specially designed for use at aerodrome stations. The receiver is used with two triangular loop aerials and a single wire open aerial. Three types of reception are provided for, the "circle" diagram, the "figure of eight" diagram and the "heart-shaped" diagram. The radiogoniometer is mounted as a separate unit and is normally arranged for single working, but if required a double directional radiogoniometer can be provided so that more than one receiver can be operated from a common aerial system.

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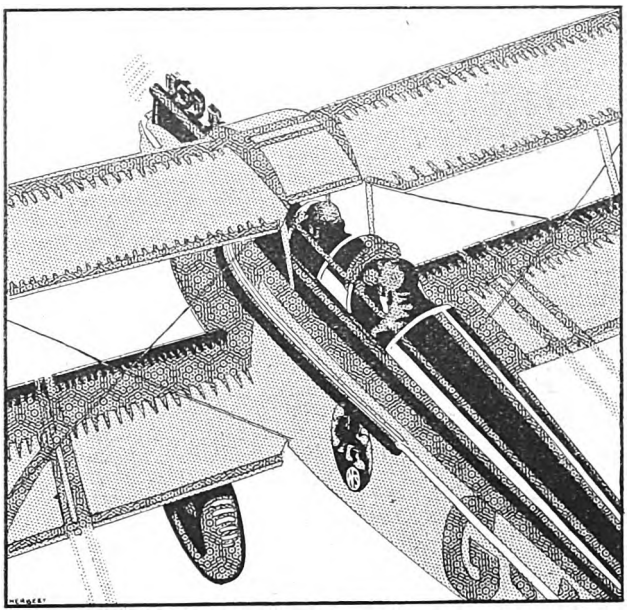

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AIR NAVIGATION.

[*"The Navigation of Aircraft,"* by Lieut. Logan C. Ramsey, U.S.N. 234 pages, 50 illustrations, price $4.50. The Ronald Press Co., New York, and from THE AEROPLANE Book Dept., Cannon House, Pilgrim Street, E.C.4. 25s.]

The author, Lieutenant Logan C. Ramsey, is a naval aviator and an acknowledged authority in the U.S.A. on aerial navigation. When the U.S. Navy started its section of aerial navigation for the Hydrographic office, Lieut. Ramsey was selected for the work, and was the first officer in charge of the section.

The text-books heretofore available on the subject have largely been written by experts on marine navigation who have adopted astronomical methods used by mariners. In these books celestial observations and their application have been over-emphasised to the neglect of the more important—from the aviator's standpoint—dead-reckoning methods.

The book points out that aerial navigation is a vital factor in flying. The methods only differ in flights of various lengths, under 200 miles, 200 to 800 miles, and 800 to 3,000 miles. It teaches that dead reckoning is the most important branch of aerial navigation and the most deserving of attention from all flyers and navigators. It thus corroborates the experience of aerial navigators and makes available a book which navigators, pilots, and students can study with the idea that its information can be put to practical use in their daily work.

AND HOW . . . . !

[*Squadron of Death.* By Dick Grace. 264 pages, 8 illustrations. Constable and Co. Ltd. Supplied by THE AEROPLANE Book Department, Cannon House, Pilgrim Street, E.C.4. 8s., post free.]

Flying films become more and more popular and the intelligent spectator is naturally beginning to ask how it is all done. The curious mentality of the film producer, and presumably the average cinema-goer, insists on one or more crashes to heighten the interest of these spectacles.

The author of this book is a "crash-specialist." He has crashed over thirty aeroplanes intentionally for the benefit of the cinemas and has lived to describe in a book exactly how it is done.

Although his work as a "double" for the film stars includes all the other dangerous pastimes like jumping off burning roofs, and express trains, and changing from one motor-car to another at 60 m.p.h., he was first and foremost an aviator.

He served with an American Squadron during the War and tried to make a living "Barnstorming" in the years that followed. From wing-walking over provincial towns to stunting for the films was a short step and eventually he became the leader of a squadron of stunt pilots who not only hired themselves and their machines individually to film producers but also hired themselves out as a complete Unit for formation displays, etc.

The most interesting part of this book, which is well written and packed with thrills, is the description of the making of the film "Wings." The Author describes in detail the crashes which he himself staged during the production.

From some points of view the wholesale loss of life caused in production of films of this sort is perhaps rather sickening. But in congratulating ourselves that it is not as done on this side of the Atlantic we should remember that we go and watch the films. Also Rome was never on the other side of the Atlantic.—C. M. MCA.

THE SKY SQUALK.

Christopher Columbus discovered America in 1492. By way of retribution, perhaps, America has been discovering England, bit by bit, ever since,—a prolonged and somewhat painful operation. And now Hollywood has discovered the Royal Flying Corps.

The Sky Hawk is a new sound film at the Tivoli, Strand. It purports to be a story of the R.F.C. in about 1917 and the plot is just about as ridiculous as it can be. The hero is, very rightly, cashiered for chasing after a girl on a service aeroplane and wrecking it on landing, within half an hour of his squadron leaving for France. With the help of his flight serjeant (who always smokes a pipe when there is any exposed petrol about and often sheds alcoholic tears on the hero's shoulder) he assembles an aeroplane—which, the story explains, has been discarded by some aircraft factory. From what we see of this machine the A.I.D. were perfectly right in discarding it. The heroine supplies a machine gun which fires tracer and explosive bullets at will (*some* girl).

The hero, although crippled by his first crash, gets into this machine, nearly drowned by the tears of the Flight Serjeant, the girl and the family butler, and with only two tins of petrol in the tank, pursues a Zeppelin over London, fights it, apparently for several hours, and eventually brings

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it down in flames. He is last seen with a V.C. hanging somewhere about his waist-line being married to the girl in the village church.

The aerodrome, the machines, the discipline, the accents, and even the canteen workers, are all pure Hollywood. The nearest thing to the R.F.C. is the Commanding Officer, who looks like an Englishman, talks like an Englishman and wears a very nearly correct uniform of a Gunner.

Undoubtedly Hollywood, in calling attention to the fact that Great Britain has an air service and recently took part in a war, did so with the best possible intentions. But, ungrateful people that we are, we do not appreciate their kindness. In other words, we are not amused.—C. M. MCA.

FOR AERO-GOLFERS.

Long before the War 1914-18 the famous firm of Accles and Pollock Ltd. showed their foresight by putting on the market steel tubing for aircraft, and, until comparatively recently, they were practically the only firm to market such tubing in any quantity. It will therefore be of interest to golfing members of the aeronautical community to know that the firm is now making the newly-legalised steel shafts for golf clubs. Air-minded golfers and golf-minded aviators will know that a steel shaft made by a firm with such a reputation must be the very best that can be made.

Hickory, of which shafts have always been made in the past, is difficult to get in a quality suitable for golf clubs. The best possible hickory is very expensive and is adversely affected by the weather. A good steel shaft is, in the opinion of many golfers, as good as good hickory and much superior to average hickory.

One has recently had an opportunity of trying a steel-shafted "Apollo" driver made by Accles and Pollock, and there is no doubt that it has increased the length of one's drive by at least 20 yards. [From what one knows of G. D.'s golf, the total length of his drive with the steel club would therefore be about 20 yards.—Ed.] [I shall withdraw my advt.—G. D.]

The club has a delightful feel to it, and the steel shaft, being much thinner than hickory, the air resistance is less. This causes the club head to travel more quickly through the air and accounts for the extra distance obtained.

The Apollo shafts can be bought from the professional of any golf club who, if he does not already stock them, can get them from George H. Hutchinson Ltd., 86, St. Vincent Street, Glasgow.—G. D.

TO TRANSPORT OPERATORS.

An ex-R.A.F. officer who has had many years' experience of running joy-rides and of taxi work is open to take a managerial job in any branch of air transport. Any firm which has such an opening is invited to communicate in confidence with the Editor of The Aeroplane.

PERSONAL NOTICES.

Marriage.

GREIG—DEAN.—On Feb. 1, at Bexhill, Flt. Lt. D D'A. Greig, R.A.F., and Miss Lorna Dean.

Forthcoming Marriage.

PIKE—ELWELL.—The marriage arranged between Flg. Off. Thomas Geoffrey Pike, R.A.F., youngest son of the late Capt. S. R. Pike, R.A., and Mrs. Pike, of Tonbridge, and Miss Kathleen Althea Elwell, of Harlow, Essex, will take place on April 23.

Births.

GRAHAM-NICHOLLS.—On Jan. 23, in London, Dolly (*née* Fairholme), wife of W. Graham-Nicholls, R.A.F.O., 2, Banks Terrace, Sheerness, Kent—a son.

LLOYD-WILLIAMS.—On Jan. 7, at Anglo-American Hospital, Cairo, to Kitty (*née* Gledhill), wife of Flt. Lt J. J. Lloyd-Williams, M.C., R.A.F.—a daughter.

POWNALL.—On Jan. 30, to Vera (*née* Savill), wife of Flt. Lt. C. H. Pownall—a daughter.

PRESLAND.—On Jan. 31, at "Skyros," Reddons Road, Beckenham, Kent, to Eileen (*née* MacCallum), wife of Flg. Off. R. C. B. Presland, R.A.F.O.—a son.

RAPER.—On Feb. 1, at 27, Palace Court, W.2, to Renée, wife of Alfred Baldwin Raper—a daughter.

RUSSELL.—On Jan. 29, at 60, Hornsey Lane, Highgate, to Margaret Ann, wife of Sq. Ldr. H. B. Russell, A.F.C., R.A.F.—a son.

SHANKS.—On Jan. 24, to Peggy, wife of Douglas Shanks (late R.F.C. and R.A.F.), 63, Glasslyn Road, Crouch End, N.8—a daughter.

WARNE BROWNE.—On Jan. 27, at a nursing home, Gosport, to Ruth (*née* Nicholson), wife of Flt. Lt. T. Warne Browne, D.S.C.—a daughter.

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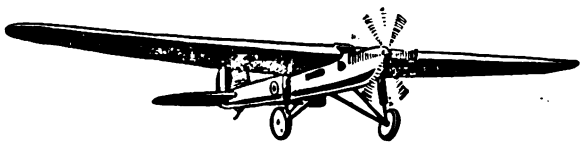

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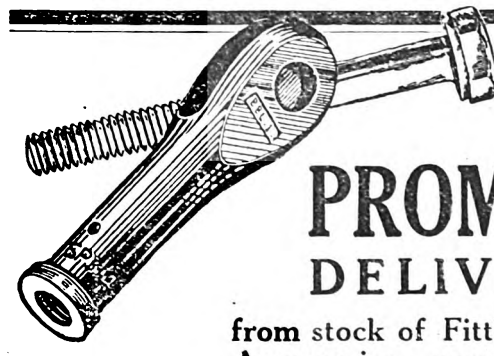

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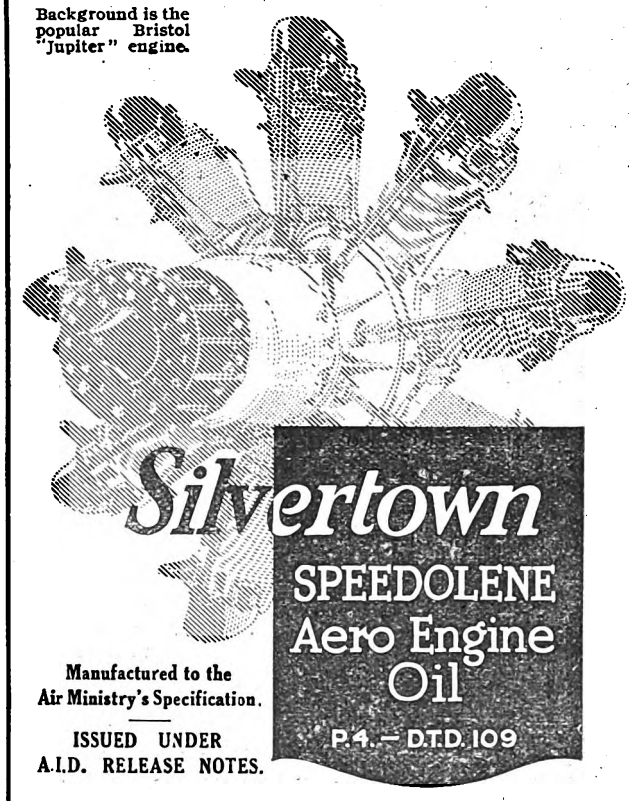

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National Flying Services Ltd. (See page 235.) Go by N.F.S. 1s. a mile; 1s. 6d. two passengers.

ACHIEVEMENT.

On Aug. 13, last, Mr. F. C. Chichester carried out his first solo flight at Brooklands. During September he toured Europe alone by air, visiting France, Italy, Austria, Roumania, Yugo Slavia, Czechoslovakia, and Germany. He has now flown alone to Australia. He was taught by Brooklands School of Flying Ltd. His Gipsy-Moth was supplied by Brooklands School of Flying Ltd. Brooklands for serious instruction. Brooklands School of Flying Limited, Brooklands Aerodrome, Byfleet, Surrey. Tel. Byfleet 436 and 437. Telegrams: Aviation Byfleet.

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INCORPORATING AERONAUTICAL ENGINEERING

Edited by C.G.Grey

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FEB. 12, 1930.

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Incorporating

Aeronautical Engineering

VOL. XXXVIII No. 7.

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ON THE REVIVAL OF BRITISH AVIATION.

On Feb. 5 The Royal Aeronautical Society, The Royal Aero Club of Great Britain, The Air League of the British Empire, and the Society of British Aircraft Constructors,—the "Big Four" which govern, under the supervision of the Air Ministry, all aeronautical activities in Great Britain and the loyal part of Ireland—held a banquet at the Savoy at which nearly all the motive power of British Aviation was present, besides some of what an aerodynamicist might call the parasitic drag.

Sir Philip Sassoon, late Under-Secretary of State for Air, and presently Chairman of the Royal Aero Club and Officer Commanding 601 (County of London) (Bomber) Squadron, Auxiliary Air Force, was in the Chair. And the gathering was distinguished by the presence as guest of honour of His Royal Highness the Duke of York, who, in proposing the toast of "British Aviation," displayed that astonishing grasp of his subject and of the situation of the moment which is characteristic of his family and gives us such good cause to be thankful for having them at the head of that Commonwealth of Nations which is known as the British Empire.

The speeches, which were commendably brief, are reported hereafter, but this seems a fitting place in which to comment on some of the points raised in them, for this banquet may be looked upon as the start of one of the most momentous years in the history of British Aviation,—besides being the beginning of a boom in British Trade.

The Hand of Industry.

His Royal Highness, quite early in his speech, touched on this point when he referred to "the absurdity of the

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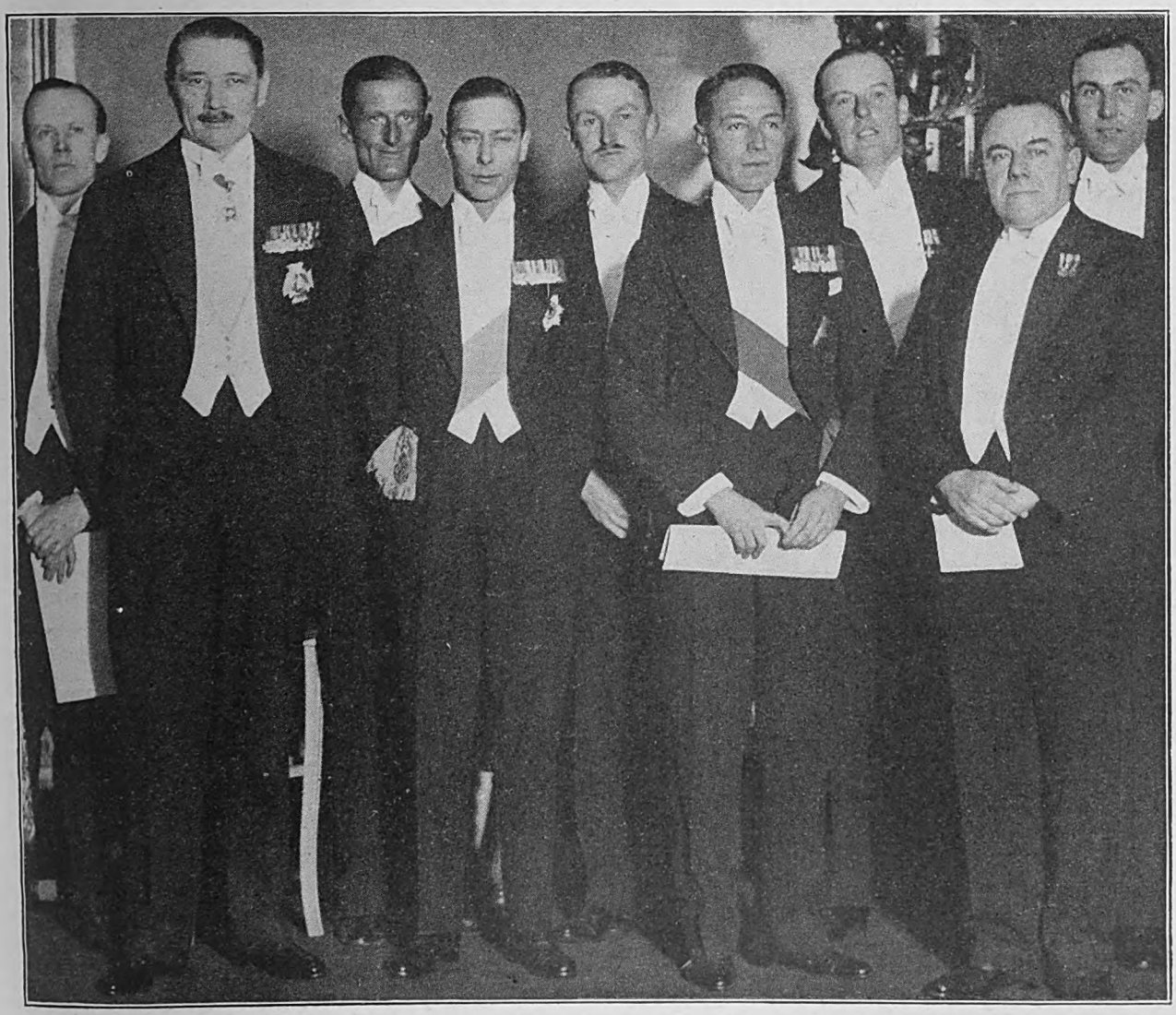

HOSTS AND GUESTS at the Savoy Banquet on Feb. 5.—Colonel the Master of Sempill, Chairman of the Royal Aeronautical Society; Air Chief Marshal Sir John Salmond, Chief of the Air Staff; Sq. Ldr. A. H. Orlebar, A.F.C., R.A.F.; Group Capt. H.R.H. the Duke of York, K.G.; Flt. Lt. D. D'A. Greig, D.F.C., A.F.C., R.A.F.; The Rt. Hon. Sir Philip Sassoon, Chairman of the Royal Aero Club; Lt.-Col. J. T. C. Moore-Brabazon, M.C.; Mr. F. Montague, Under-Secretary of State for Air, and Flt. Lt. R. L. R. Atcherley, R.A.F.

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statement we sometimes heard, that the hand of British Industry had lost its cunning." That phrase deserves to become historic as a companion to that of his Royal Brother the Prince of Wales, when he suggested that our salesmanship was not worthy of our workmanship.

As has been said so often in this paper, the British Workman is the master-craftsman of the World. But there have been times when, although the hand of British Industry has never lost its cunning, the head of British Industry has almost lost its astuteness,—which is cunning of a different kind. Happily to-day that charge is being disproved. Industry as a whole is waking up, and the British Aircraft Industry in particular is embarking on an enterprising and enlightened policy.

Day by day, almost, one hears of new useful types of aeroplanes which are a-building or in advanced stages of design. And one looks forward with some anxiety to a time some six or eight weeks hence, when the new British aircraft begin to come out for trial, for fear that they may be so many and so good that there will not be room enough in this paper to describe them as fully as they deserve. If the output of new types keeps to anything like schedule the months of April, May, and June this year should show the World the finest crop of commercial aeroplanes that has yet been seen, ranging from what look like being almost ideal machines for the private sportsman up to just the type of flying-boat which is most needed to operate a high-speed mail service to the furthest parts of our Empire.

The Mothers of the Empire.

There is a certain humour in the fact that two noblewomen should have given us the finest lessons in the possibilities of aviation for the Empire. The Duke of York's graceful recognition of the Duchess of Bedford's flight to India and back in eight days, and of the Honourable Lady Bailey's lone flight round Africa was well deserved.

LEADERS OF THE MOVEMENT.—Left to right,—Sir Philip Sassoon, Lord Wakefield of Hythe, Lady Wakefield, Mr. Handley Page, The Hon. Lady Bailey, D.B.E., and The Duchess of Bedford.

If Lord Trenchard is to be known hereafter as the Father of the Royal Air Force, and if Lord Wakefield is to go down to History as the Patron Saint of British Aviation, then Her Grace of Bedford and the daughter of the Rossmores deserve to become historic characters as the Mothers of Imperial Communications.

There is biological authority for the statement that great men owe their characters to their mothers rather than to their fathers. So let that be a happy omen for the future of Civil Aviation within the Empire. And anyhow they are a fine argument against those who regard our best families as an effete aristocracy.

With them might well be joined Mrs. Wilson of Kenya, who is the first person in the British Dominions to organise an air-line without Government subsidy. She also has set an example to our timorous capitalists and business men.

One does not lose sight of the fact that Mr. Charles Barnard was the "organiser of victory" in the Indian flight, nor does one forget (as certain organisers of banquetry seem to have forgotten) that Mr. Robert Little was the engineer, navigator and relief-pilot on whom success depended just as an Army's success depends on its Engineer and Service corps. But the Duchess of Bedford was the Napoleon of the campaign.

And as for the Round Africa flight,—well, the Hon. Lady Bailey, D.B.E., is a wilful woman who must have her way across Continents just as when, as the Hon. Mary Westenra, she had to have her way across country. Which is the finest possible example for our young sporting aviators.

Incidentally, writing of the Ancestors of Aviation, one was glad to hear the Duke of York express publicly "the pleasant thought," as he called it gracefully, that the services and experience of Lord Trenchard are always at the command of the State. Most people who wrote of his retirement from the office of Chief of the Air Staff seem to have forgotten that a Marshal of the Royal Air Force is always on the Active List, and merely goes on half-pay.

A graceful touch also was that of Sir Philip Sassoon, who referring to Lord Wakefield's new peerage, rejoiced that the Patron Saint of British Aviation is still with us although he has recently gone to a higher sphere. With that sentiment all will agree,—especially those aeronautical institutions which seem to regard him less as a patron saint than as what, one is told, the gold-diggers of Broadway call a sugar-daddy.

The Spirit of the Nation.

The spirit of British Aviation to-day was neatly and wittily indicated by Sir Philip Sassoon when he said that the only constituent part of British Aviation that was not flying by itself, or nearly so, was the Officer Commanding No. 601 Squadron (himself). But we had the Duke of York's evidence that Sir Philip is learning to fly, so that also indicates the right spirit.

In quite another direction the right spirit was shown in the announcement of the posthumous award of the Gold Medals of the Royal Club—the highest recognition in the Club's power—to Squadron Leader Jones-Williams and Flight Lieutenant Jenkins, for their non-stop flight to India. The memory of that undeafeatably cheery pair John-Willy and Jenkins is thus fittingly perpetuated in the archives of British Civil Aviation.

When we came to the awards to the Schneider Team the assembled multitude expressed their admiration in suitable terms. Recent promotions must have made the business a trifle confusing for the Press, because Flight Lieutenants Waghorn and Atcherley and Moon had to go to the High Table and receive certificates and trophies which were won by Flying Officers Waghorn and Atcherley and Moon. But the recipients did not seem to mind.

Lines of Development.

In allotting honour where it was due Sir Philip Sassoon raised a point which deserves mention when he said that Mr. Handley Page was trying to make aeroplanes as fool-proof as motor-bicycles. Here one rather questions the justice of Sir Philip's simile.

Judging by the daily list of deaths, sudden and lingering, caused by accidents on our roads, the motor bicycle seems far from fool-proof. In fact it seems to be about Fate's most efficient weapon for the extermination of fools,—even more so than the habit of looking down the muzzles of unloaded guns, which was the popular substitute for it in the days before motors were invented.

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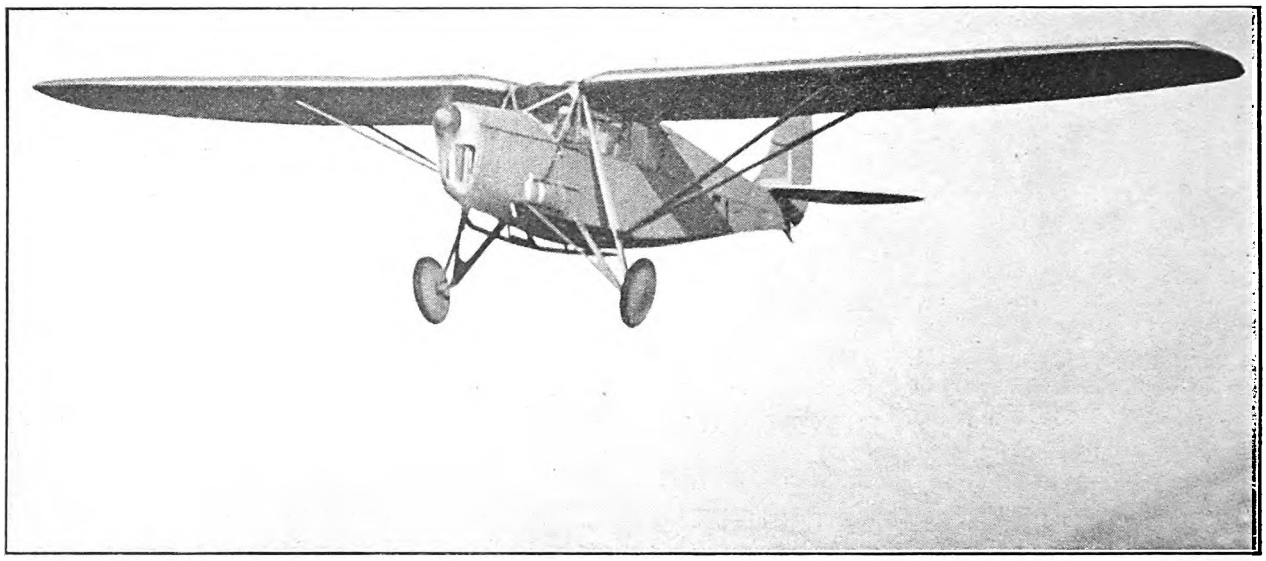

PROGRESS.—The latest De Havilland Moth, the Mark III (Inverted Gipsy).—Clear view ahead, and a top speed of 125 m.p.h.—(*"Aeroplane" photograph.*)

by individual pilots of motor-bicycles or of aeroplanes, the aeroplane must be considerably the safer vehicle. But it can be made a great deal safer than it is.

So if Mr. Handley Page and his experimental staff will kindly accelerate their good work they will confer still greater benefits on Humanity. And, incidentally, they will reap a reward alongside which the lost Guggenheim Prize will look a mere circumstance. Moreover they will win it without having to carry a lawyer in the back seat of the aeroplane—as Mr. H. P. amusingly said of the Guggenheim Competition. But Heaven forbid that even then aeroplanes should ever be as thick in the air as motor-bicycles are on the roads.

Mr. Montague's bright remark about the hard-faced angel who sits up in the Treasury-loft will strike an answering chord in the hearts alike of humble members of Flying Clubs, and of magnates of the Aircraft Industry who hope for orders for large and expensive experimental aircraft, and of wealthy sportsmen who ought to pay for the Schneider seaplanes of 1931 but expect the Government to pay. The hard face and unpryable hand of Mr. Philip Snowden may yet make all our fortunes by forcing aviation to fly by itself, as Mr. Churchill said, instead of being spoon-fed by the Air Ministry.

Now that Big Money is beginning to be interested in Air Transport as a commercial proposition, Civil Aviation may expect to be weaned from its wet-nurse in Kingsway. And, judging by the new aircraft which are coming along, it will soon be self-supporting.

The Air Ministry needs all the money it can wring out of Mr. Snowden for experiments with war-machines. If some of those machines happen to be of types which help to develop efficiency in civil machines,—as, for example, long-range flying-boats might easily do,—so much the better for Civil Aviation. And high-powered engines developed for war-machines may yet help us to win and keep the Schneider Trophy. But that is all we should expect.

The Uses of Clubs.

The only hope Mr. Montague held out was for the continuation of subsidies for the Flying Clubs. Here one agrees that the expenditure might be justified,—but only on condition that the Clubs undertake to give something in return.

One recommends Mr. Montague—and Lord Thomson, and Sir Sefton Brancker—to study the Mussolini-cum-Balbo scheme described in The Aeroplane last week. As a taxpayer one objects to handing out money to the Clubs, and to National Flying Services also, just so that young women and old crocks can go joy-riding in the air more cheaply than they could if there were no subsidies.

The fact that unsubsidised flying schools and unsubsidised joy-ride firms are as busy as they can be at higher prices, shows that if people want to fly they will find the money to do it. But there must be many young men who might be useful in time of war who cannot afford to learn to fly. Therefore one recommends that the whole scheme of subsidies be revised, and that subsidy-money be only paid for men who first of all pass the doctor as fit for general service, who secondly pass as pilots fit for service flying, and who thirdly sign an undertaking to serve in time of war.

That would enable the Clubs to keep going and to buy new machines. And the Nation would get something in return. Meantime the Clubs would be doing just as much to increase air-mindedness as they are at present.

Propaganda.

The statement by Mr. Handley Page that the Aircraft Industry are ready to make great sacrifices to defend the Schneider Trophy, coupled with his acknowledgment that our aircraft need fuller publicity (otherwise advertising) is all to the good. One only hopes that all members, and particularly associate members, of the S.B.A.C. agree with him and will support his efforts.

If we can proclaim to the World next June, either that we will put up a team that will defy all challengers, or that nobody has challenged and we are admittedly supreme in the air, and if the Trade embarks on a propagandist campaign such as those to which our brethren in America have accustomed us, all will be well with the Trade and with British Aviation.

All that sort of thing means spending big money, and when one has been hard up for as many years as we people in British Aviation have been, one gets out of the habit of spending money. Also, to cultivate a taste for champagne on a beer income is foolish. But there is such a thing as casting bread upon the waters, by way of baiting the swim.

The Aeroplane has done its best ever since the profit-making years of 1915-1920 to uphold the prestige of British Aviation by giving the World a well-written and well-informed aviation paper. In doing so it has lost money heavily in some years, and it has barely made both ends meet in the others. It is still far from making up the money it lost in trying to maintain through the post-War slump a paper as fat and as prosperous-looking as seemed needed to impress the World with the importance of British Aviation.

Lately the position has improved, so we have been able to produce a more fair-seeming paper. And our intention is to go on improving The Aeroplane, week by week, as more and more support is accorded to us by the Trade, so that British aircraft may have the propaganda and publicity which Mr. Handley Page so rightly said it needs.

Last Wednesday's affair was wholly in the right spirit for such propaganda. There was an atmosphere of optimism and yet an air of serious intention about everybody present which showed a firmer faith than ever in the future of British Aviation. Let us all hope that this may prove to be the opening of a campaign which will end only by seeing us as supreme in the air with our Civil Aviation as was the Royal Air Force in 1918. Such a result is well within our powers. All that is needed is that spirit of co-operation and hard work which won the Schneider Trophy for us last year.—C. G. G.

THE SPEECHES.

Group Captain His Royal Highness the Duke of York, K.G., proposing "British Aviation," said that the toast implied too much in these days when nearly every day we read of some new and magnificent feat of skill and endurance performed by some man or some woman in some new machine. He was specially glad to have been able to accept the kind invitation of the Royal Aero Club because he considered that it was a great honour to have served in the R.A.F. and to have become a pilot after the War. Although it was ten years since he had flown, his family was well represented in the air. His brother, the Prince of Wales, was the owner of an aeroplane, and made full use of it whenever he could do so in his busy life.

He was also glad to be present because it enabled him to associate himself with the tribute which was now being paid to the very skilful team of officers of the R.A.F. which had retained for Great Britain the blue riband of the air world, the Schneider Trophy. All those present knew the

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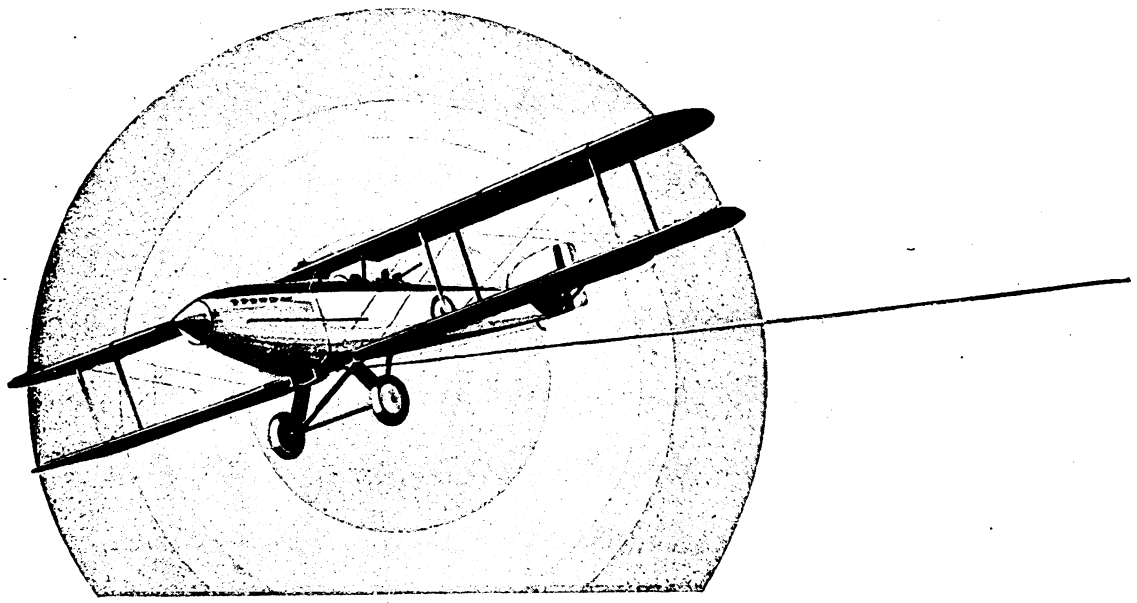

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details of that great victory and how it had been won at a speed of some 328 m.p.h. by Flying Officer Waghorn piloting a Supermarine-Rolls-Royce seaplane. Records had been made and broken again in the race itself by that officer and his colleague, Flying Officer Atcherley, flying a sister machine. And later when the speed record had been attempted by Squadron Leader Orlebar and Flight Lieutenant Stainforth, the new records had been broken.

There were others to whom honour was due. We found as one of the Directors of the Supermarine Aviation Works, a brilliant aircraft designer, Mr. R. J. Mitchell, and allied with him in the Schneider Trophy victory, a veteran engineer who was still the moving spirit of a world-famous firm, Mr. F. H. Royce. Such a combination was surely proof of the absurdity of the statement we sometimes heard that the hand of British Industry had lost its cunning.

British Industry had more than a reflected glory from the triumph that we were celebrating to-night. He had been told that forty trades had contributed to it, and the steel-makers in Sheffield and the light-alloy trades of Birmingham, to name only two, had played their parts. Research workers in Government establishments and in private laboratories all had a hand in the victory.

There had been of late many notable long-distance flights. He would refer only to one, that of the Fairey-Napier monoplane from England to India in one flight. The value of that last achievement had not been dimmed by the disaster which had befallen those two gallant officers, Squadron Leader A. G. Jones-Williams and Flight Lieutenant Jenkins, in attempting in the same aeroplane, the yet greater feat of flying non-stop to South Africa. Forces of nature and not the default of man had terminated an enterprise full of high hope. He had learned to-night that the Royal Aero Club had decided to award these two officers posthumously the gold medal of the Club, the highest honour within its power to bestow.

The non-stop flight to India brought him to yet another achievement, that of the flight to India and back in just under eight days of Capt. C. D. Barnard and the Duchess of Bedford whom we were so glad to welcome and to whose labours and courage in the cause of aviation he was glad to pay his tribute.

Another lady's name would be present in his hearers' minds. Lady Bailey had set a new standard for women aviators by her single-handed flight in a light aeroplane from England to the Cape. And by her return along the West Coast she had blazed a new trail for the private owner. No honour had been more fully deserved than that which had lately been conferred upon her.

Within the last few weeks the British air world had heard with gratification that His Majesty the King had been pleased to honour two men who, in their respective spheres, had made their mark upon British Aviation progress.

Marshal of the R.A.F. Sir Hugh Trenchard needed no introduction to this audience. He had been rightly called the Father of the Air Force, and though, as Lord Trenchard he was now no longer actively associated with the Supreme Command, it was a pleasant thought that, in the case of officers of high rank, their services and experience were always at the command of the State.

The other name was more intimately associated with the Royal Aero Club and was connected with almost all the Empire flights other than those done by the Service. It was that of Lord Wakefield, more familiarly known by his former title of Sir Charles Wakefield. No man had deserved better of the British air world not only by his generous support of the racing activities of the Club, but by his courage and vision in fostering Imperial flights.

He saw here the first Englishman to fly, a pleasant reminder of the youth of the Science of Aviation, for it was barely 21 years ago that Lieut. Col. J. T. C. Moore-Brabazon had made the first flight over English soil at the Royal Aero Club's flying ground at Eastchurch.

In coupling the names of the Chairman of the Royal Aero Club and the Chairman of the Society of British Aircraft Constructors with British Aviation in his toast, His Royal Highness said that since accepting command of No. 601 County of London (Bomber) Squadron, Auxiliary Air Force, Sir Philip Sassoon had been learning to fly, the better to carry out his self-imposed duties of commander. Mr. Handley Page was a pioneer whose name was associated with safer aircraft. With such men the future of British Aviation was indeed bright and its technical progress assured.

The Rt. Hon. Sir Philip Sassoon, responding, said that on behalf of the Royal Aero Club, the Royal Aeronautical Society, the Air League of the British Empire, and the Society of British Aircraft Constructors, he wished to express their gratitude to the Duke of York for his kindness in coming, and the honour that his presence conferred on the gathering. His Royal Highness and the Prince of Wales and other members of the Royal Family had always done everything in their power to further the progress of British Aviation. By precept and example they had been of the greatest practical help in stimulating healthy competition among all those actively engaged in aviation and by always applying themselves, whenever opportunity offered, to accustom the minds of the general public to look upon flying as the ordinary proper means of travel.

The King's Cup which had been given by His Majesty every year since 1922 was the Blue Riband of flying in this country as the Schneider Trophy was the Blue Riband of international flying. It was most gratefully appreciated by the members of the Royal Aero Club.

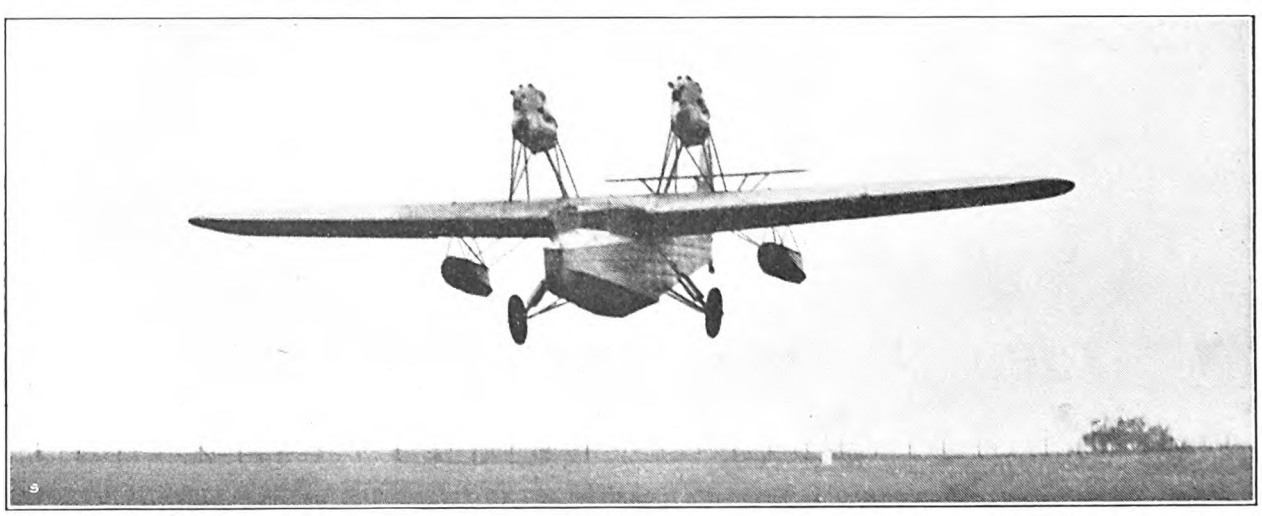
The award, posthumously alas, of the gold medal of the Club to the two gallant officers who had lost their lives in the attempt to fly non-stop to South Africa, was the highest honour the Club could offer.

They were delighted to welcome on this occasion the Schneider victors and those who had helped to organise the victory. They honoured the skill, courage and judgment of the pilots and the technical skill without which to guide him, no pilot could give of his best.

The achievements of the heroines of the evening read more like a romance by Jules Verne than the sober accomplishments of a noble lady who had been anxious to open the eyes of her compatriots and of another lady who had flown by herself back from the Cape by a route not previously traversed by any pilot.

From the abundance of recent achievement it had been difficult to select the most noteworthy. The light aeroplane movement was tending to development from a sport to a convenience of transport. Lady Bailey and Squadron Leader Hinkler had shown that there was nothing a light aeroplane could not do if you had an independent spirit and a taste for travel.

He believed that the Flying Clubs would play a leading part in the development of aviation for years to come. Sir Alan Cobham and Sir Charles Wakefield had done valuable work in awakening interest in the establishment of municipal aerodromes all over the country. And National Flying Services were still further increasing the number of aerodromes.



PROGRESS.—The Amphibian Cutty Sark (Two Cirrus Hermes) built by Saunders-Roe Ltd., of Cowes.

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BRITANNIA TROPHY AGAIN!

The Britannia Challenge Trophy is awarded by the Royal Aero Club to the British Aviator who shall have accomplished the most meritorious performance in the air during the year.

1929

Awarded to The Hon. Lady Bailey, D.B.E., for her 18,000 miles solo flight round the African Continent.

"One of the most striking achievements in the history of aviation."

LADY BAILEY used a

CIRRUS ENGINE!

1927

Awarded to Flt.-Lieut. R. R. Bentley, A.F.C. for his 8,000 miles pioneer flight from London to Cape Town.

Flt.-Lieut. Bentley used a

CIRRUS ENGINE!

1928

Awarded to Sqdn.-Ldr. Hinkler, A.F.C for his 12,000 miles pioneer flight from England to Australia in 15½ days.

Sqdn.-Ldr. Hinkler used a

CIRRUS ENGINE!

CIRRUS AERO ENGINES, Ltd.,
Regent House,
89, KINGSWAY, LONDON, W.C.2.

Telephone: HOLBORN 4076.

Telegrams: OCIRRUSO, LONDON.

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Mr. Handley Page was trying to make aeroplanes as foolproof as motor bicycles. The only constituent part of British Aviation that was not flying by itself, or well on the road to do so, was the O.C. No. 601 Squadron.

Mr. Handley Page, also replying to the toast, said that he wished to associate himself with every word the Chairman of the Royal Aero Club had said in thanking His Royal Highness for honouring the gathering.

Referring to the development of British Aviation, he said that the multifarious activities of the Director of Civil Aviation and of the Air Member for Supply and Research suggested that he ought to be speaking not on behalf of the Aircraft Trade but of the Licensed Trade. Aircraft, from the time of their birth, were pursued by licences.

The question might be asked what was the matter with British Aviation? We had flown (not the speaker himself) to India and back in less than a week, and he thought that the feat had not received full credit. He took off his hat to the Noble Lady who had done this trip as a passenger. And even more we respected one who had actually piloted a machine across the trackless wastes of Africa which only some fifty years ago were first discovered by Livingstone.

If there were to be standards of comparison his standards, like charity, began at home. British aircraft had improved in recent years beyond all measure. He did not propose to speak of military aircraft because by doing so he might infringe Official Secrecy and render himself liable to an enforced holiday such as some of our fellow-citizens were now undergoing.

He was glad to see with us Mr. Cordes back from America. He had taken part in a two-seater competition in which, apparently, the pilot had to be in the front seat with a lawyer in the back.

What the Aircraft Industry of this country needed was publicity, propaganda, and the ability to show to the World the goods we had to sell. No other country had such good aircraft to sell, but we did not always put them in the front window. He quoted an American paper, *Aero Digest*, as saying that if anyone wrote to a British firm asking about the specifications and performances of aircraft, the information was forthcoming at once, but that such information could not be got with the same promptitude and certainty from American firms.

With regard to the Schneider Trophy Contest next year. He had heard the Prime Minister on the steamship *Orford* tell the Italian representatives that we were going to do our best to retain it. What was the best that Mr. MacDonald was going to do? Was it only going to be "conversations"?—because he would like to see something definite done. The Aircraft Industry was willing and prepared to make considerable sacrifices to retain the Trophy. If we won it again it would never depart from this country, where it was such a valuable stand for the hats and coats of the members of the Royal Aero Club.

The Schneider Team represented the finest form of co-operation, and the Contest represented the utmost endeavour in the realm of Speed. He hoped we should get a little bit of support from the Government,—rotten though it might be. The Under-Secretary of State for Air had asked him before dinner to give him a lead for his speech, and he had done his best.

Mr. F. Montague, Under-Secretary of State for Air, associated himself with what had been said about the Conquest of Speed. He paid a tribute to the late Squadron Leader Jones-Williams and Flight Lieutenant Jenkins, and said that they represented the Spirit of Britain.

The Government had announced that they could not in the immediate future take a direct part in fostering the important Schneider Trophy Contest. There was a hard-faced angel who sat in the Treasury loft and it was felt that the expenditure of public money involved by Government participation was no longer justified.

The participation had been undertaken originally to encourage construction and the science of aviation, and to collect data. And they felt that the data and results so far had justified the expenditure of the past. But the time had come for the Industry to start running on its own legs so far as that International Trophy was concerned.

He hoped that the Industry would see its way to put in a British entry by its own enterprise, in view of the international interest of the contest and its advertisement possibilities for the Aircraft Industry of the successful country,—which they all hoped would be Great Britain next time as on the two previous occasions.

He said that the Flying Clubs were developing the air sense of the Nation, and he was conscious of their financial difficulties. He could assure them that their requests for further support were being sympathetically considered by the Government. This was not a promise, but he advised the Clubs to share the modified rapture of a reasonable optimism.

His Royal Highness the Duke of York then presented Royal Aero Club awards and certificates for the following notable performances:—

Flight to India and back in eight days, Aug. 2-9, 1929.—Royal Aero Club Gold Medal, Capt. C. D. Barnard; illuminated address, the Duchess of Bedford.

Britannia Trophy (awarded for most meritorious performance of the year).—Lady Bailey, for her light aeroplane flight from England to South Africa and back along the West Coast, ending in January, 1929.

100-kilometre Record.—Flg. Off. H. R. D. Waghorn, on Sept. 7, 1929, Supermarine-Rolls-Royce S.6, at 330.1 m.p.h. (which beat previous record of 1927 by 50 m.p.h.) Later the same day this was beaten by Flg. Off. R. L. R. Atcherley, also Supermarine-Rolls-Royce S 6, at 331.6 m.p.h.

Royal Aero Club Certificates.—Flight-Lieut. H. R. D. Waghorn, Flight-Lieut. R. L. R. Atcherley, Supermarine Aviation Works Ltd. and Rolls-Royce Ltd.

World's Speed Record.—Flight-Lieut. G. H. Stainforth, Sept. 10, 1929, at Calshot, Gloster-Napier 6. Speed, 336.3 m.p.h.

Two days later, Sept. 12, 1929, Sq. Ldr. A. H. Orlebar, Supermarine-Rolls-Royce S.6, beat this by doing 357.7 m.p.h. This record is 39 m.p.h. in excess of the Italian record of 1928.

Certificates of the Royal Aero Club.—Flight Lieut. G. H. Stainforth, Sq. Ldr. A. H. Orlebar, Gloster Aircraft Co., D. Napier and Son, Ltd., Supermarine Aviation Works, and Rolls-Royce Ltd

Schneider Trophy Team.—Silver cigarette boxes presented by the Royal Aero Club to Sq. Ldr. A. H. Orlebar, Flight Lieut. G. H. Stainforth, Flight Lieut. D'Arcy Greig, Flight Lieut. H. R. D. Waghorn, Flight Lieut. R. L. R. Atcherley, and Flight Lieut. T. H. Moon.

Here one may add that, on the excellent principle of Trade Within the Empire, these very artistic boxes were the product of Mr. Skinner of Bond Street, who was during the War 1914-18 a distinguished war-pilot of the R.F.C. and R.A.F.

The certificates for the Trade firms were presented to Sir Robert McLean of the Supermarine Works, Mr. Burroughes of the Gloster Co., Mr. Vane of Napiers, and Mr. Sidgreaves of Rolls-Royce.

The Rt. Hon. the Lord Wakefield of Hythe, proposing "The Chairman," said that when the true history of the War came to be written he hoped that what Sir Philip Sassoon did at those wonderful conferences at Lympne when his hospitality and vision generated friendship among our great Allies would be recorded in letters of gold.

Neighbours were not always the best of friends, but as his neighbour at Hythe he felt he must say that Sir Philip did good by stealth and blushed to find it fame.

Sir Philip Sassoon, in reply, said how glad he was to have his health proposed by the Patron Saint of British Aviation, who, though he had recently gone to a higher sphere, was still happily with us.

THE AIRCRAFT INVESTMENT CORPORATION.

On Oct. 23, 1929, The Aeroplane published a short article to the effect that a group of important financiers had recently begun to take an active interest in aviation and that the combination was the biggest thing that had happened in British Aviation. At the time one stated that unfortunately a disclosure of the composition of this particular group was not advisable, and the only name mentioned was that of Sir Henry Segrave, who had been appointed technical adviser. Recently sundry daily papers, doubtless having had the wit to search the files of Somerset House, have made considerable play with the discovery of this firm, which is called the Aircraft Investment Corporation Ltd.

Those who have been in communication with the firm will have learned from its notepaper that the Directors are Andrew Holt (Chairman), P. W. Pitt, H. C. Bevan, Ian W. W. Shepherd, Brian E. Lewis, Sir Henry Segrave, H. P. Holt, and D. C. Tewson

The name of Mr. Andrew Holt is already well known in aviation, because he has during the past year or so toured most of Europe in a Fokker Monoplane piloted by Mr. Macintosh. He had an accident in Holland which put him in hospital for some time, but that accident has in no wise affected his faith in air transport, nor has it put him off flying himself. The Holt family are big bankers in Canada, and are not the same family whose bank used to be so kind to the overdrafts of R.A.F. officers during the War.

Somebody who has been searching the files in Somerset House has discovered that among those interested in the firm are Sir H. Cunliffe-Owen, Lord Ashfield, Messrs. Gow and Parsons, stockbrokers; Mr. S. B. Joel, and Mr. R. O. Hambro.

According to *The Daily Express*, the firm's big idea is to develop air transport, and thus to help British aircraft construction. Whether the firm intends to operate air-

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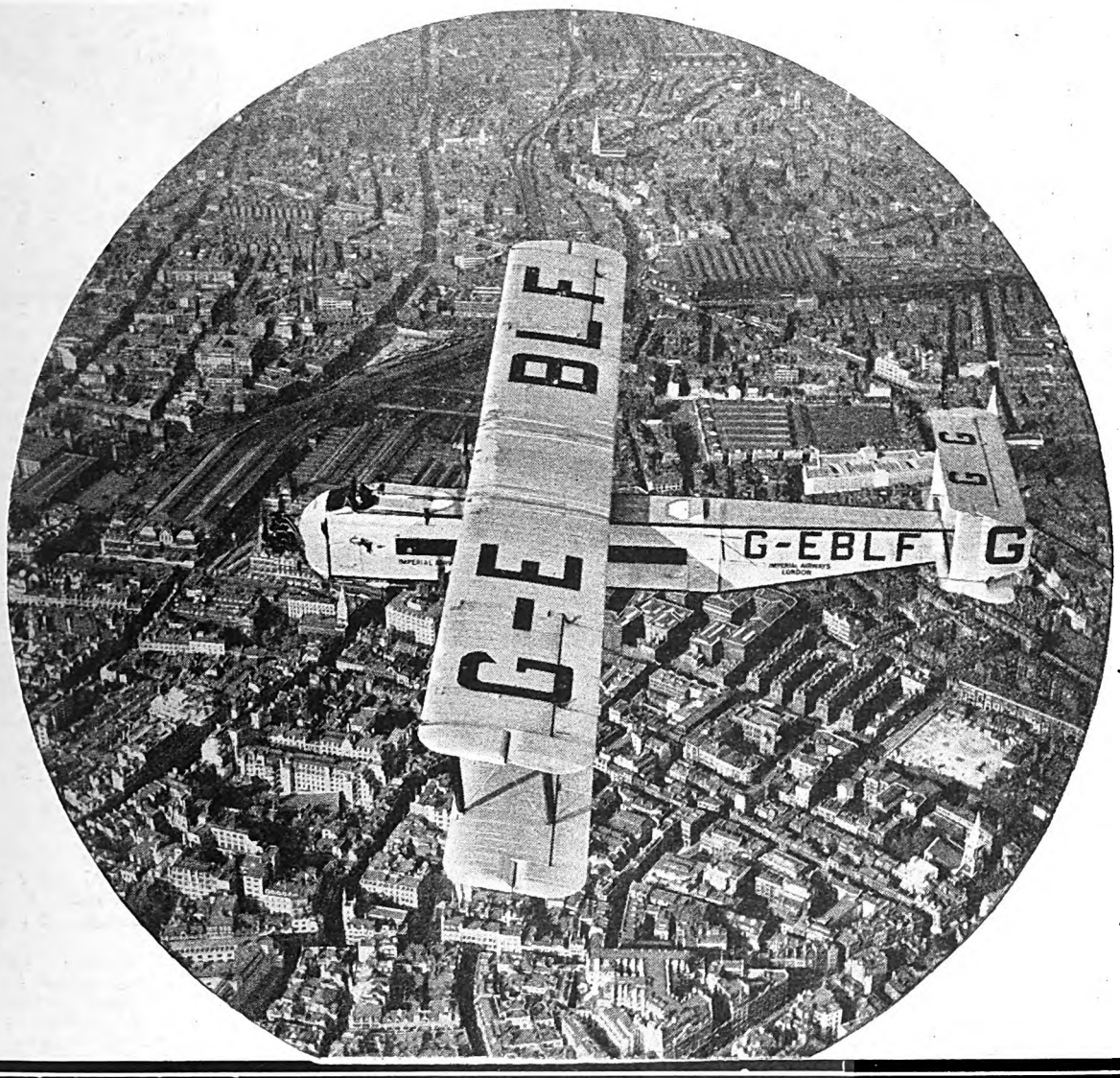

919,320 Argosy Miles

DURING the past 4 years (to October 31st, 1929), seven Argosies in the European Fleet of Imperial Airways Limited have flown 919,320 miles in 10,118 hours. They have carried over 50,000 passengers; they have crossed the channel nearly 4,000 times.

The Argosies are the safest, best paying and most easily maintained Air Liners in existence.

SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT LIMITED.
Works and Aerodrome: Whitley, Coventry. London: 10 Old Bond Street, W.1

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THE WONDER-WORKER.—The latest Blackburn Iris Rolls-Royce Condors), which, with petrol for 1,000 miles on board, flew the 500 miles from Brough to Plymouth in less than 5 hours, starting an hour or so after being launched for the first time.

craft itself and to compete directly with subsidised air-lines one does not pretend to know. But the fact is already well known that the firm holds big interests in the Blackburn Aeroplane and Motor Co. Ltd. of Leeds and Brough, and in Saunders-Roe Ltd. of Cowes.

Something of the effect of this community of interests may be seen in the fact that Saunders-Roe Ltd. have already been for some months building a metallised version of the Blackburn Bluebird, and a fair assumption seems to be that, having common financial interests, the two firms instead of competing with one another will concentrate their energies on producing aircraft of entirely different types, each of which will compete with the products of other aircraft firms.

For example, the Blackburn Company, having had such remarkable success with seaplanes and with the big Iris flying-boats, and having an excellent seaplane base at Brough, might reasonably be expected to concentrate on flying-boats of the very largest size, leaving smaller boats of the successful Cutty Sark type to Saunders-Roe.

Such a policy is likely to be strengthened by the truly remarkable performance of the latest Iris (three Rolls-Royce Condors), which, with petrol for 1,000 miles on board, left Brough at 10.20 hrs. one morning last week and, flying all round the coast of Kent, reached Cattewater, Plymouth, at 15.15 hrs.,—thus covering the 500 miles non-stop in a trifle under five hours, in spite of a brisk west wind all the way down the Channel.

This performance was the more remarkable as the two pilots of the machine had never flown it, or any ship of comparable size, till the morning of the flight. Having tried the machine on the Humber, and having shown that they could get it off and onto the water without porpoising, they took it straight round the coast. This may be regarded as a somewhat noteworthy trial trip, seeing that the machine was only put through her first trials by Sq. Ldr. Rea that same morning.

There is no doubt that the Aircraft Investment Corporation Ltd. has already been well advised in acquiring interests in these two firms, each of which includes some of the most famous pioneers of aviation. And one gathers that the firm also holds a big interest in yet another aircraft firm, the name of which must not at the moment be disclosed.—C. G. G.

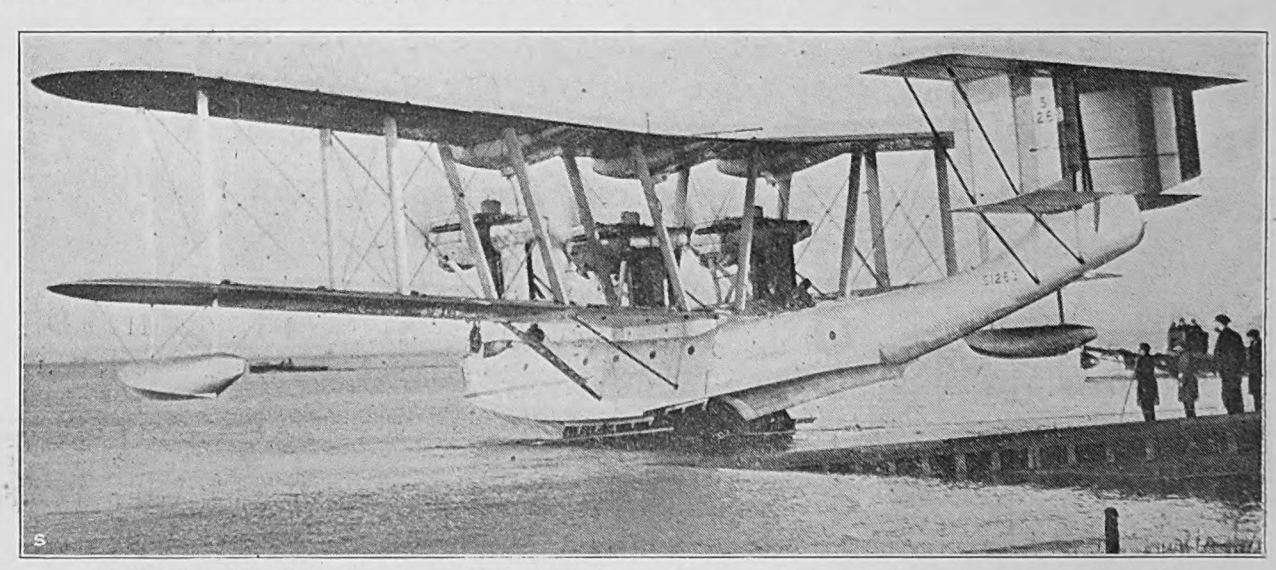
THE BRITISH EMPIRE AND THE AIR.

On Feb. 7 Lord Thomson, Secretary of State for Air, gave an address on "Aviation and the British Empire" at a lunch given by the British Empire League at the British Empire Club, St. James's Square.

Lord Thomson said that the air routes of the British Empire in 1928 amounted to 11,000 miles, and in 1929 to 19,000 miles. By the end of 1930 it was hoped that these figures would reach a total of 35,000 miles. Last year's proportion of mileage throughout the Empire was: Canada, 6,500 miles; Australia, 5,500 miles; South Africa, 1,500 miles; India, 715 miles, and Great Britain, 5,000 miles.

It was said that commercial aviation should fly by itself, but the nearest approach to a self-supporting concern in the World had been reached by Imperial Airways. The indirect subsidies of the U.S. Air Mail routes were enormous.

To Imperial Airways had been entrusted the task of developing the great trunk lines linking Great Britain with India, Australia, and South Africa. By the time that the present India route was extended to Australia and the new Cape route was in operation the British Empire would have 35,000 miles of air routes. The surveys of both these routes were well under way, and they should be open by the end of this year.



DOWN TO THE SEA.—The fourth Iris (Rolls-Royce Condors) taking to the water for her first trials.

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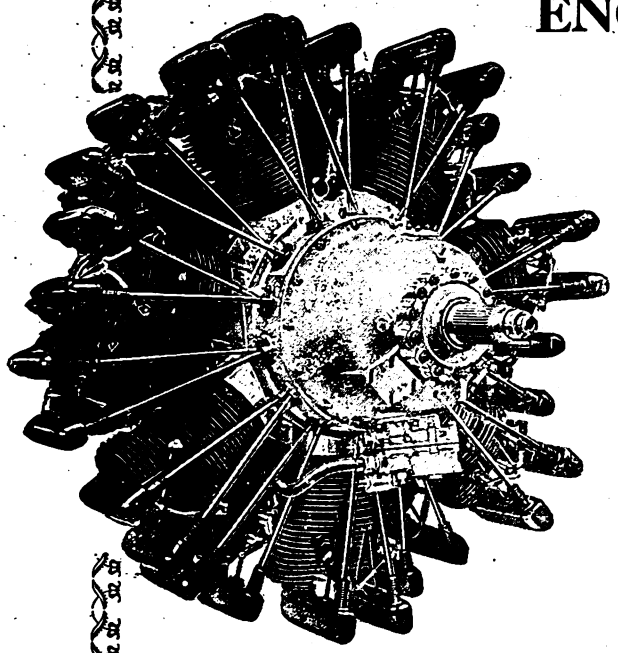
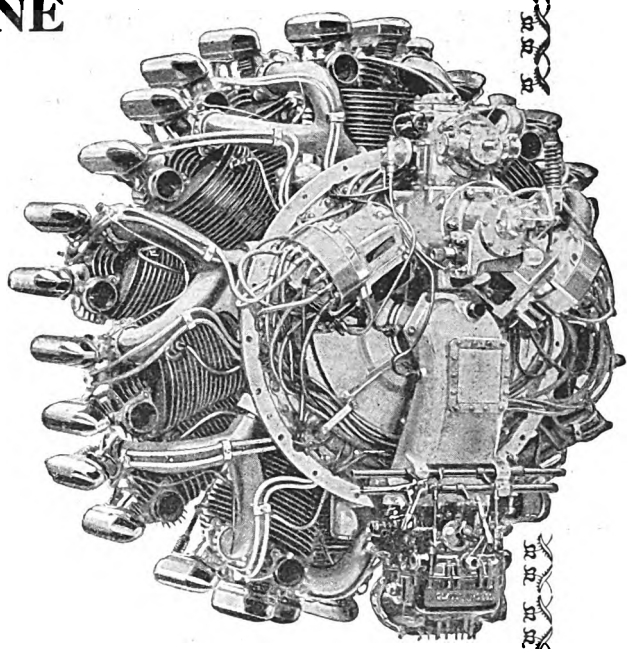
A New ARMSTRONG SIDDELEY ENGINE





The

Jaguar Major (Geared)

THE Jaguar Major is a brilliant addition to the world-famous range of Armstrong Siddeley air-cooled engines. It is made in two types, one with geared fan rated at 525 h.p. at 3,000 feet and developing a maximum of 560 h.p. at sea level, and the other with supercharger rated at 500 h.p. at 11,500 feet and developing a maximum of 450 h.p. at sea level.

The power weight ratio of these two types is 1.75 lbs. (.79 Kg.) per h.p. for the geared fan and 1.98 lbs. (.9 Kg.) per h.p. for the supercharger, while the overall diameter is 46.75 in. (1.187 m).

ARMSTRONG SIDDELEY MOTORS LTD.,
COVENTRY, ENGLAND.
and 10, Old Bond St.,
London, W.1

FLOWN & KNOWN ALL OVER THE WORLD

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Before turning to the question of airships, Lord Thomson said he wanted to state definitely that he was out to support as far as he could the Light Aeroplane movement.

On the subject of airships he said: "I am most amazed at the ignorance displayed by the critics of airships. The airship programme has cost round about £2,000,000, but the knowledge gained in regard to air matters generally has been well worth the money." Continuing, he remarked that the preliminary trials of the two airships had given enough satisfaction to justify reasonable optimism with regard to the future of this form of transport. The airship was an essential vehicle for passing over seas, and was not a rival or competitor of the aeroplane.

Among those present were: Lord Southborough (who presided), Marshal of the Royal Air Force Lord Trenchard, Lord Luke, Col. J. L. Ralston, Minister of National Defence, Canada; Air Marshal Sir J. F. A. Higgins, the Maharajah of Burdwan, Maj. Gen. Sir Granville Ryrie, Brig. Gen. Sir S. H. Wilson, the Hon. J. E. Fenton, Sir Louis Dane, Sir Edward Harding, Mr. F. Montague, M.P., Sir Atul Chatterjee, Sir Harry Brittain, Sir Dennistoun Burney, Sir James Connolly, Sir Herbert Daw, Sir Howard D'Egville, Sir Robert Donald, Sir George Fuller, Admiral Mark Kerr, the Master of Sempill, and Sir Leslie Wilson.

IN MEMORY OF A PIONEER.

The town of Muret, the home of M. Clément Ader, who is recognised as the Father of Flying in France, has formed a committee to collect subscriptions to erect a monument to that great pioneer of aviation. Subscripions however small will be gratefully received by the President or Secretary, addressed to the Fund at Muret, Haute-Garonne, France.

There has been much dispute concerning whether Clément Ader ever actually flew on his steam-driven twin-screw monoplane which he called the *Avion*. Some years ago the French Government held an inquiry, and came to the conclusion that during the experiments at the Military Camp at Satory in 1897 the Avion did in fact leave the ground under its own power, though it was not under complete control as we understand flying in these days.

Nevertheless the performance, at that early date, was such as to entitle M. Ader to be called the Father of Aviation. And the Government recognised the fact by adopting the word "avion" as the official description of all war machines. The word has in fact come into general use in French to-day for all aeroplanes, civil as well as military.

The Committee of Muret has embarked on a grandiose scheme for a central monument to which will lead alleys named after the other great pioneers of aviation, Wright, Santos Dumont and Farman, as well as the war-time hero Guynemer, thus rendering at once homage to the Father of Aviation and to the other heroes of the air. The scheme is wholly estimable, and one hopes that some English money will be contributed to it.

WHO BOUGHT IT?

Some time ago an American concern bearing the grandiose name of the General Development Corporation of Connecticut, circularised the aeronautical press of the World announcing the almost immediate production of a giant commercial aeroplane which was the conception of a certain Dr. Christmas.

Allowing for the ambitious claims of the authors of this highly imaginative publicity, for the fact that engines of the horse-power quoted do not exist, and for the previous reputation of Dr. W. W. Christmas, whose earlier claim to fame in America had apparently slipped the memory of many people, the Christmas Giant gained considerable prominence in Europe.

The Aeroplane dealt with the story in a few carefully chosen words, but some journals devoted as many as three and four pages to description and illustrations.

The New York Times has now exposed the whole thing as a fraud. It states that the company is purely hypothetical, that the necessary capital to form a company is unobtainable, that the works exists only in the imagination of the promoters, and that the whole project was nothing else than a deplorable stunt, the object of which was to provide publicity and financial gain for Dr. Christmas and his confederates.

Once again we say good-bye to Dr. Christmas. His previous effort resulted in the death of a very good pilot. His latest adventure was comparatively harmless and he is perfectly welcome to any laughs he may have got out of it.

PERFORMANCE FIGURES.

An Australian engineer-aviator writes as follows:—

This question of claimed-versus-attained performance affects us in semi-tropical countries to a greater extent than it does in the land of ice and fogs, so a few points may interest you. The first thing is landing or stalling speed, and what each means.

In the B.E.S.A. Glossary there is no definition, as far as a cursory search reveals, of "Landing Speed." "Alighting" is given, and, neglecting for the moment the definitions used by pilots for "landing," "alighting," and "arriving," the only conclusion is that landing-speed is the same as stalling-speed.

If we define it as the speed at which the aircraft hits the ground, this will be a variable depending on whether the particular pilot "lands" or "arrives." Apparently all the modern test-pilots make perfect "three points" at about ten feet when finding the landing speed of commercial aeroplanes,—for upon plotting about forty claimed landing-speeds against wing-loading, and (your friend) Kl., one found that in almost all cases the claimed landing-speed was from ten to fifteen miles per hour lower than the stalling speed.

A slide of this graph was shown at a meeting of the Sydney branch of the R.Ae.S.I., and some of the aircraft operators got up and said that not only in landing-speeds were the majority of aeroplanes "boosted," but climb and top-speed were just as badly treated by the Sales Manager.

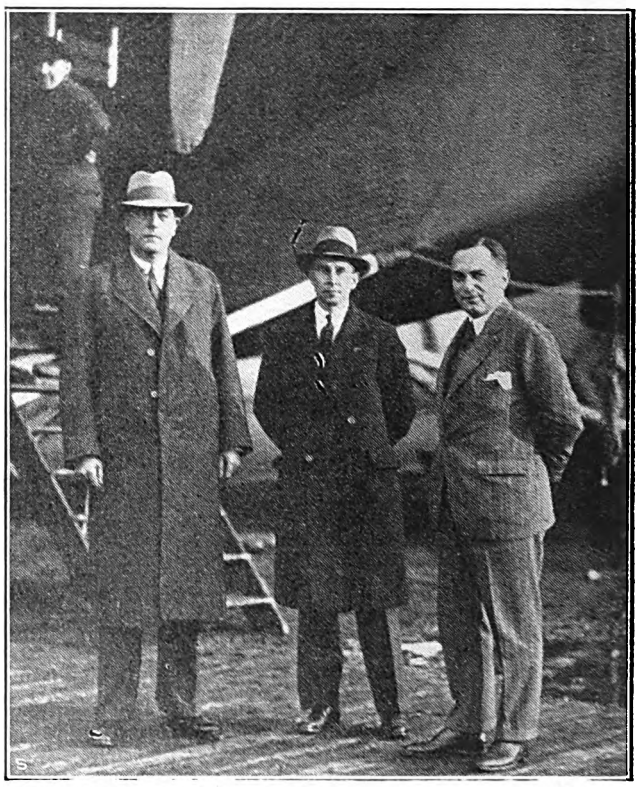
Of course the American "engineer" may have discovered a new Law better than $L = Kl.S\rho V^2$. But if so they have guarded it better than the Air Ministry guards the speed of the year-before-last's fighters. Incidentally the recent issues of *Aviation* have had a somewhat similar graph, calling attention to this same thing.

So far as the climb of American machines is concerned it is poor on the types so far seen out here,—excepting the Curtiss Robin with a Warner Scarab. The Ryan is awful, and in the Eaglerock, American Eagle and Ireland Meteor and Comet it is quite imperceptible. Now down-currents are not unknown even in this perfect flying country, and sometimes these machines have to sit down in the nearest paddock.

Anyhow the American airworthiness load-factors are somewhat easier to meet than the British ones,—being a little more reasonable.

The reason for inverted commas round "engineer" is a recollection of your favourite definition "One who can do for one dollar what any dam-fool can do for ten." What is a man who can do for ten dollars what any dam-fool can do for one?

By the way, in speaking of engineers (much abused name), do you not think that the faults to be found with aircraft designers, as a whole, are due to most of them spending most of their time on aircraft, and also getting their technical training in close contact with aeroplanes, and not seeing much of the other types of structures which the civil engineer deals with? As far as the "scientist" is concerned, one would prefer to have a "B.Sc. Lond. (Eng.)" design the wing spars than the chief mechanic at the Blank Aircraft Co. Ltd. Perhaps the reverse would be the case where the wing fittings were concerned, unless the B.Sc. was a bit above the average and had the sense to use Coker's photo-elastic methods to find the stresses in things like fittings and lugs.



VISITORS.—Mr. C. R. Fairey, Sq. Ldr. M. E. A. Wright, and Dipl. Ing. A. R. Boehm, of the Junkers Co., with the G.38 at Dessau.

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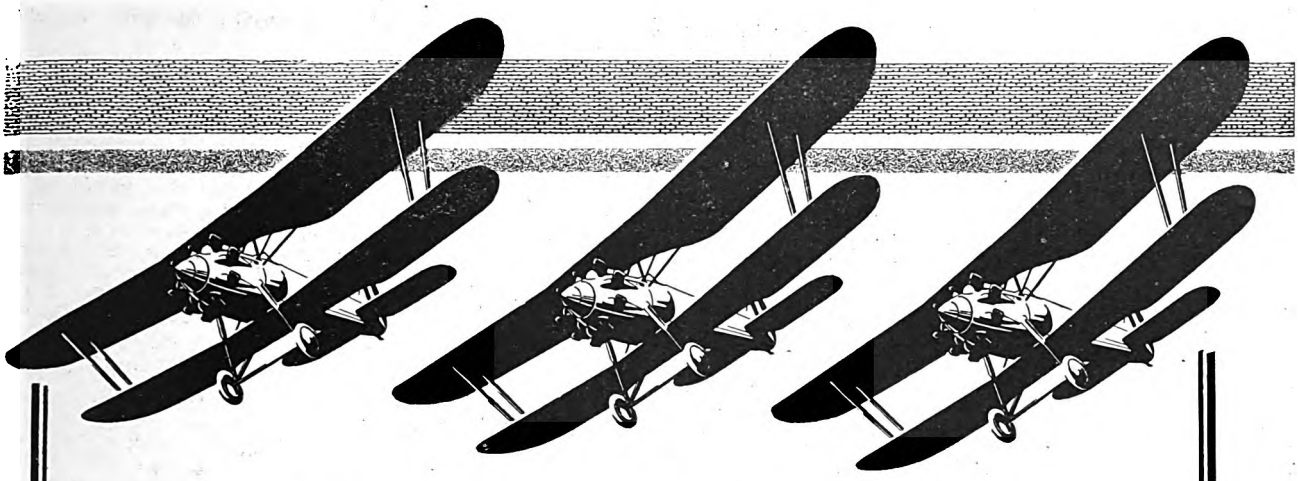

The

"Bristol"

BULLDOG

SINGLE SEATER FIGHTER.

Constructed throughout of high tensile steel and incorporating the "Bristol" method of Steel-strip structure, is the most formidable military single seater fighter in the world at altitudes above 10,000 ft.

It is designed and constructed by

THE BRISTOL AEROPLANE CO. LTD.,
FILTON — BRISTOL.

Telephone: Bristol 3906. Telegrams: Aviation, Bristol.

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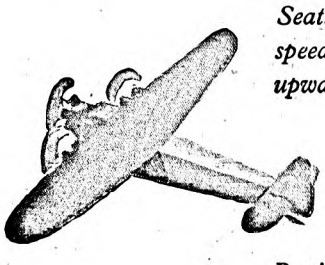
AFRICA AND AUSTRALIA COME AGAIN!

For the second time, we are able to announce the receipt of orders from Australian National Airways Ltd., of Australia, and Wilson Airways Ltd., of Kenya, for the Avro 10 and the Avro 5 respectively. These repeat orders are the deliberate endorsement by experienced operators of an original choice. They provide, in the most practical manner possible, still further proof that the Avro 5 and the Avro 10 commercial aeroplanes have no rival in the world, in their particular classes, for safe and economical transport by air.

AVRO·5

Seats pilot and four passengers. Cruising speed 95 m.p.h. Range from 400 miles upward. Pay load up to 980 lbs.



AVRO·10

Seats two pilots and eight passengers. Cruising speed 100 m.p.h. Range from 400 miles upward. Pay load up to 2,400 lbs.

Particulars of these and other models may be obtained from A. V. ROE & CO., LIMITED
166 PICCADILLY, LONDON, W.1 *Works:* Newton Heath, Manchester & Hamble, Southampton

The sole English distributors for the Avian light aeroplane are Henlys (1928) Ltd., Studebaker Building, Glasgow Terrace, Grosvenor Road, S.W.1.

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THE ROYAL AIR FORCE.

The London Gazette.

Air Ministry, February 4.

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—Sub-Lt. T. P. Coode, R.N., is granted a temp. comn. as a Flg. Off. on attachment to the R.A.F. (Jan. 22).

The following Plt. Offs. are promoted to the rank of Flg. Off.:—S. A. Davis (Dec. 29, 1929); J. R. Ayling (Dec. 29, 1929); P. W. A. Dudgeon (Jan. 28).

Flg. Off. A. R. Leslie-Melville is placed on the retired list on account of ill-health (Jan. 31). Flg. Off. E. G. Hordern resigns his perm. comn. (Jan. 15). The S.S. comn. of Plt. Off. on probation R. R. R. J. Holmes is terminated on cessation of duty (Feb. 4).

STORES BRANCH.—The following Plt. Offs. on probation are confirmed in rank and promoted to the rank of Flg. Off. (Jan. 10):—V. H. B. Roth, M. H. Robinson, J. E. V. Tyzack R. C. Storrar, G. Blinman. Plt. Off. on probation H. H. Hilliar is confirmed in rank (Jan. 10).

MEDICAL BRANCH.—The following Flg. Offs. are promoted to the rank of Flt. Lt. (Feb. 2):—B. B. Kennedy, M.B., B.Ch., J. Kemp, M.B., Ch.B., J. B. Murphy, M.B., B.Ch., R. F. MacLatchy, M.D., C.M., J. J. Quinlan, M.B., B.Ch.

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—The following Plt. Offs. are promoted to the rank of Flg. Off.:—C. H. Carter, A. F. Fleetwood-Lawton (Jan. 30); H. C. Usborne (Jan. 31).

Flg. Off. I. C. Horton relinquishes his comn. on appointment to a comn. in the New Zealand Air Force (Territorial) (Oct. 10, 1929); Flg. Off. D. P. Cameron, M.B.E., relinquishes his comn. on account of ill-health, and is permitted to retain his rank (Jan. 29); Flg. Off. M. A. Newnham, D.F.C., resigns his comn. (Jan. 10).

Appointments.

Week ending February 10.

GENERAL DUTIES BRANCH.—Wing Commanders A. F. A. Hooper, O.B.E., to Home Aircraft Depot, Henlow, for Engineer duties, 27/1. F. W. Stent, M.C., to H.Q., Fighting Area, Uxbridge, for Engineer Staff duties, 11/2.

Squadron Leaders W. E. G. Bryant, M.B.E., to No. 54 Sqdn., Hornchurch, 15/1. C. L. Scott, D.S.C., to Special Duty List, for duty with British Naval Advisory Staff, Chile, 15/1. G. R. A. Deacon, M.C., to H.Q., Inland Area, Stanmore, 26/1. F. Fernyhough, M.C., to H.Q., R.A.F., India, 1/1. W. H. Dunn, D.S.C., to H.M.S. *Glorious*, 20/1. H. B. Russell, A.F.C., to No. 1 Air Defence Group H.Q., 16/1.

Flight Lieutenants J. Bussey, to Air Ministry (A.M.S.R.), 14/1. L. G. Harvey, to R.A.F. Depot, Uxbridge, 21/1. L. Young, to Home Aircraft Depot, Henlow, 8/1. E. A. Healy, to No. 600 Sqdn., Hendon, 1/1. H. L. Macro, D.F.C., A.F.C., to H.M.S. *Glorious*, 20/1. F. G. S. Mitchell, to H.Q., Coastal Area, 27/1. R. H. Barlow, to H.Q., Coastal Area, 22/1. C. P. O. Bartlett, D.S.C., to School of Technical Training (Men), Manston, 15/12.

Flying Officers J. B. Mackenzie, to Station H.Q., Mount Batten, 26/1. E. N. V. Everett, to No. 60 Sqdn., India, 1/1. J. W. Busteed, to Station H.Q., Hornchurch, 15/1. V. S. W. Smyth, to No. 99 Sqdn., Upper Heyford, 23/1. J. St. C. Arbuthnott, to Night Flying Flight, Biggin Hill, 10/1. R. R. Nash, to C.F.S., Wittering, 18/1. G. Bartholomew, to C.F.S., Wittering, 15/1. J. Norwood, to Royal Air Force College, Cranwell, 17/1. D. M. Harrison, to R.A.F. Depot, Uxbridge, 24/1. N. H. Thompson and T. W. Walker, to No. 2 F.T.S., Netheravon, on appointment to S.S. Comns., 14/1.

Pilot Officers E. J. Finnegan, to No. 54 Sqdn., Hornchurch, 15/1. A. Haywood, to No. 60 Sqdn., India, 1/1.

STORES BRANCH.—Flight Lieutenant E. C. Farman, to Station H.Q., Hornchurch, 15/1.

ACCOUNTANT BRANCH.—Squadron Leaders A. R. Thomas, to H.Q., R.A.F., Cranwell, 17/1. R. H. Cleverly, to A. and G. School, Eastchurch, 24/1.

Flying Officers T. C. Reep, to Home Aircraft Depot, Henlow, 10/1. R. J. Wishlade, to Station H.Q., Hornchurch, 15/1.

Pilot Officer C. E. Hunter, to Station H.Q., Andover, 17/1.

The Royal Air Force College.

The Air Ministry announces that the following Flight Cadets successfully completed on Dec. 13, 1929, their course of training at the Royal Air Force College. The names are arranged in alphabetical order:—

L. W. C. Bower, E. S. Dru Drury, A. Earle (Winner of Air Ministry Prize for Aeronautical Engineering), G. R. A. Elsmie (Winner of Abdy Gerrard Fellowes Memorial Prize, Sword of Honour, and R. M. Groves Memorial Prize), J. Grierson, P. Heath, J. Heber-Percy, G. F. W. Heycock, J. Y. Humphreys, B. H. Jones, W. H. Kyle, E. F. J. L'Estrange, R. V. McIntyre, W. N. McKechnie, W. Sawyer, A. G. Teideman, R. L. Wallace (Winner of Air Ministry Prize for Humanistic Subjects), F. F. Wicks.

In addition to the above, the undermentioned Flight Cadet has passed the examination, but will return to the College to complete flying training:—

R. T. P. Clarkson.

The Thompson Speed Trophy.

Acting on behalf of Sq. Ldr. Orlebar, the holder of the World's Record for Speed in the Air, Sir Esmé Howard, the British Ambassador at Washington, accepted, on Feb. 5, from Senator Bingham, President of the American National Aeronautic Association, the Thompson Speed Trophy presented through the Association for the greatest speed attained in the air.

The Trophy itself is being kept at the Embassy and a small bronze replica will be sent to Sq. Ldr. Orlebar.

The Long-Distance Record Attempt.

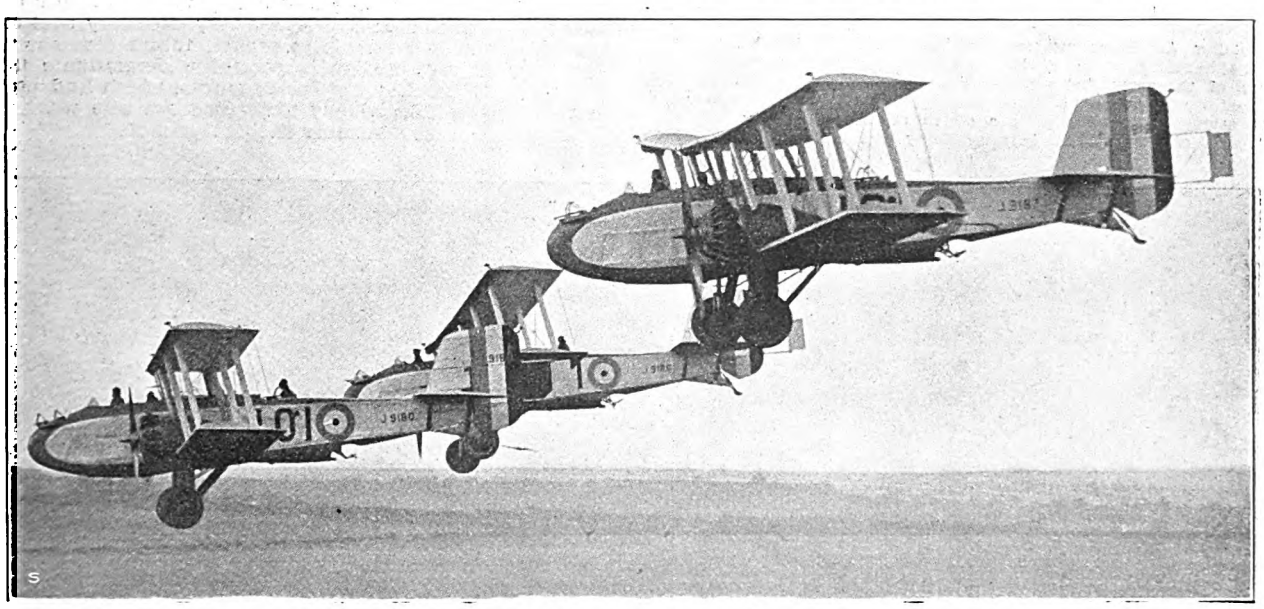
In the House of Commons on Feb. 5, in reply to a question by Mr. Everard, the Under-Secretary of State for Air said that no proposal to make a further attempt upon the long-distance flight record had yet been considered.

The R.A.F. Display.

In the House of Commons on Feb. 5, in reply to a question by Mr. Mander, who wanted to know whether, in connection with the R.A.F. Display this year, it was proposed to stage an event bearing a relation to the possible duties of the R.A.F. under the Covenant of the League of Nations, the Under-Secretary of State for Air said that the programme and set-piece for this year's Display had not yet been finally settled.

R.A.F. Establishment.

In the House of Commons on Jan. 29, in reply to a question by Mr. O. Lewis, the Under-Secretary of State for Air said that the total number of officers and men of all ranks in the R.A.F. in July, 1929, was 30,670. Replying to a further question Mr. Montague said that the first-line strength of the R.A.F. in July, 1929, was approximately 770 aircraft. There were no airships in commission: the two at present under trial were primarily intended for Civil Aviation.



"MENS AGITAT MOLEM" (the Motto of No. 101 (Bomber) Squadron, R.A.F.).—The first photograph of a formation of Boulton and Paul Sidestrands (Bristol Jupiter engines). They are the equipment of No. 101 (Bomber) Squadron, R.A.F. Andover.—(*"Aeroplane" photograph.*)

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The Royal United Service Institution.

The Gold Medal and the first Trench Gascoigne Prize of the Royal United Service Institution for the best essay in the 1929 Competition has been awarded to Wing Cdr. C. J. Mackay, M.C., D.F.C., R.A.F. The winner of the second Trench Gascoigne Prize is Brigadier-General H. Rowan-Robinson, C.M.G., D.S.O. The essays written by Lieutenant-Colonel C. L. Day, Royal Signals, and Flt. Lt. G. M. Knocker, R.A.F., have been honourably mentioned by the referees. The subject was "The Rôle of Aircraft in Coast Defence."

The gold medal and prizes will be presented at the annual general meeting in the Theatre of the Institution on Mar. 4.

Rugby Football.

The Royal Navy defeated the Royal Air Force at Twickenham on February 8 by a goal and two tries (11 points) to a try (3 points).

Although this is the widest margin of points that the Navy have beaten them by since 1921, the R.A.F. team shows more promise than it has done at this stage for several years. It is essentially a young team. A spectator referred to it, after the match, as John Russell's Infant Class. But that is not quite correct.

If the team had had Wing Commander Russell's coaching and leadership from the beginning of the season there would have been a different tale to tell to-day. As it was they put up a heroic fight against a team which was faster, better together, and more experienced.

At full back, Plt. Off. Ievers, often hard pressed, was steady and confident and kicked a good length.

The three-quarter line has developed into a useful defence force, but has not quite enough speed or initiative in attack. The wings were never hemmed in, but often left unsupported.

At stand-off half Flt. Lt. Odbert was not entirely at home with Wing Cdr. Russell, but he made some fine openings several of which should have led to scoring.

Wing Cdr. Russell at scrum half was behind a beaten pack during most of the game, but the invincible strategy of—may one suggest?—a quarter of a century of Rugger, gave the Air Force backs very nearly as much of the ball as their opponents. Apart from that the whole team got just that leadership and inspiration that a young side needs.

The forwards, in the first half, were outshoved in the scrums and outpaced in the loose, but they improved rapidly and stayed a gruelling game with first-class honours. It would not be fair to say that they were lost without Flt. Lt. Beamish, but undoubtedly, if he had been there, they would have combined to better advantage. Special mention should be made of Sjt. Kerby, who was in the forefront of the battle both in attack and defence.

The Navy started the scoring when they got clean away from a line-out—after missing an easy kick at the goal from a penalty—and Lee crossed on the right wing. The goal kick fell short. Navy pressure was held up by a good tackle by Hodder. Llewellyn eased the pressure with a long drive from a penalty and then Llewellyn and Pott made ground with a counter-attack. Gosling fielded a loose punt and found touch with a tremendous kick. Another penalty against the R.A.F. was followed by two Air Force attacking movements, both of which broke down by faulty handling. (Oversea readers should realise that the day was bitterly cold and that frozen hands but not cold feet was the order of the day.) A penalty against the Navy was taken by Llewellyn but was fielded by Gosling, who gave the Navy forwards a chance to make ground with the ball at their feet.

Another Air Force movement among the backs broke down with faulty handling. The Referee was particularly prominent at this stage of the game and performed the best part of a cantata. One spectator at least felt a throb of sympathy with those spectators of professional Soccer who go to a match armed with empty bottles.

A bout of short passes between Kerby and Constantine gained 25 yards for the R.A.F., but twenty minutes from the start the Navy scored their second try, Wood having snapped up a loose ball and made ground. He was tackled and lost the ball but recovered and went over with it. There is a maxim about tackling which says that when you tackle a man you should put him down so hard that you can count ten before he is any use again. This maxim was observed by the R.A.F. during this match, but not on this particular occasion. Webster converted.

Two minutes later Kerby intercepted a Navy pass from a scrum and passed to Odbert, who made ground. The forwards were well up and Williams scored. The goal kick failed. A bout of kicking was followed by some good Air Force forward work in the loose and a drop at goal by Llewellyn which fell short.

The Air Force began to show marked improvement forward. A long, clean pass by Russell sent Odbert away on one of those perilous solo runs of his which, when he brings them off, gain tremendous advantage for his side. He was through most of the Navy defence before he passed to Llewellyn who passed to Hodder. Hodder and Gosling went over the line in a heap, with Gosling on top.

A Navy attack followed and Wood, who might have scored a try, took a drop at goal which failed. Odbert and Llewellyn took an Air Force counter-attack to the Navy's 10-yard line before they were driven back by a touch kick by Gosling.

Russell broke through on his own early in the second half and punted ahead but the Navy were ready for him and fielded and cleared. Another Air Force attack was foiled by Gosling who gathered the ball and ran back with it half the length of the field. Further attacks by the R.A.F. were blocked first by a Navy back making a mark and then by a free kick to the Navy.

Half-way through the second half the Navy scored, St. Clair Ford running well down the right wing after a bout of short passes among the Navy forwards. The goal kick failed. For the rest of the game the Air Force were mostly in the Navy's half, but they just failed to score. Hodder intercepted a Navy pass and went alone. With only the Navy's right wing and full-back between him and the goal he faltered and passed. He was absolutely unsupported. In the last five minutes the Navy had to touch down twice and the game ended well in Navy territory.—C. M. MCA.

The teams were:—

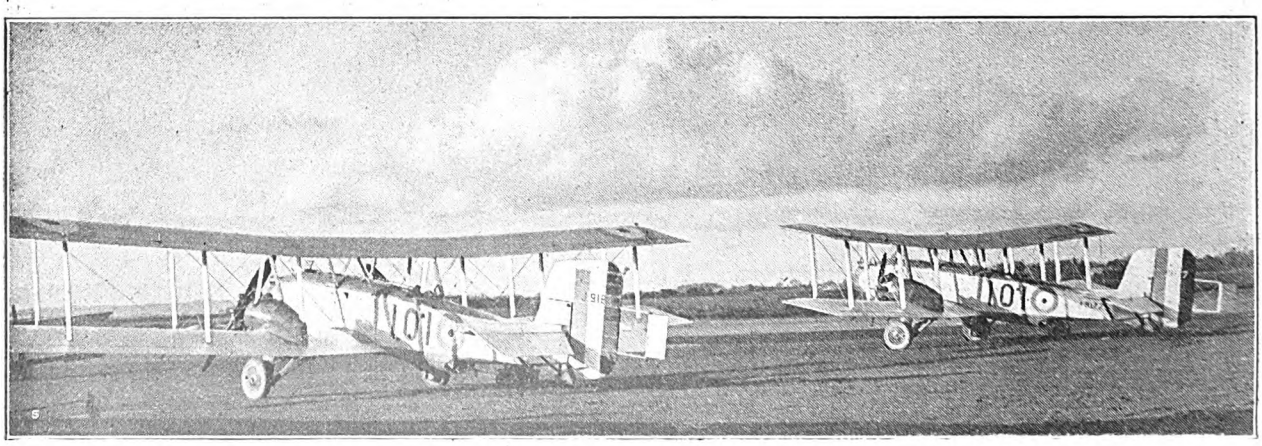
The Royal Navy.—Sub-Lieut. C. G. Gosling (R.N.E. College, Keyham), back; Sub-Lieut. D. St. Clair Ford (H.M.S. *Dolphin*), Lieut. T. S. Lee (H.M.S. *Parthian*), Lieut. G. M. Sladen (H.M.S. *Dolphin*), and Lieut. W. H. Wood (captain) (H.M.S. *Erebus*), three-quarter backs; Mdspn. A. E. Hargrave (R.N.E. College, Keyham) and Sub-Lieut. G. Webster (R.N.E. College, Keyham), half-backs; Lieut. T. G. P. Crick (H.M.S. *Vernon*), M.A.A. W. G. A. Luddington (H.M.S. *Vivid*), Lieut. J. W. Linton (H.M.S. *Dolphin*), Mdspn. N. L. Evans (R.N.E. College, Keyham), Marine C. Webb (R.M. Depot, Plymouth), Lieut.-Cdr. W. C. Thomas (H.M.S. *Dolphin*), Lieut. C. M. Morrell (R.N.E. College, Keyham), and Sub-Lieut. R. K. Hodgkin (R.N.E. College, Keyham), forwards.

The Royal Air Force.—Plt. Off. G. M. Ievers (Digby), back; Flg. Off. R. D. Cotton (Duxford), Flg. Off. J. R. H. Pott (Grantham), Plt. Off. J. G. Llewellyn (Worthy Down), and Flg. Off. F. S. Hodder (Henlow), three-quarter backs; Flt. Lt. R. V. M. Odbert (Andover) and Wing Cdr. J. C. Russell (captain) (Air Ministry), half-backs; Sjt. J. Kerby (Halton), Plt. Off. G. E. S. Williams (Digby), Plt. Off. J. McKechnie (Calshot), Flg. Off. H. A. Constantine (Cranwell), Flt. Lt. J. G. Franks (Eastchurch), Sjt. A. C. Hall (Wittering), AC. V. E. Maxwell (Duxford), and Plt. Off. A. C. Wallace (Upavon), forwards.

OXFORD AND AVIATION.

A statute to prohibit undergraduates from flying during term except as members of the University Air Squadron, was passed in Congregation at Oxford on Feb. 4.

The Senior Proctor, proposing the statute, said that it was about 100 years since the University had tried to keep the railway out of Oxford, and about 1,000 years since Canute had made an even more hopeless attempt. He was a keen supporter of flying and thought that it had a great future, but for that reason it was very necessary that some legislation should be made to control future developments. The form of organisation to control undergraduate flying was ready to hand in the Air Squadron, which had proved so very successful, and any undergraduate who wanted to fly should do so as a member of this squadron.



DAY BOMBERS.—Two of the Boulton and Paul Side strands of No. 101 (Bomber) Squadron, R.A.F., on the aerodrome at Andover. The Sidestrand is the only tw in-engined general-purpose type aeroplane in Service use. No. 101 (Bomber) Squadron is commanded by S q. Ldr. F. H. Coleman, D.S.O.—(*"Aeroplane" photograph.*)

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THE CO-ORDINATION OF DEFENCE SERVICES.

One day in last December, in the House of Commons, Dr. E. L. Burgin, LL.D. (Liberal Member for Luton) moved,

That, in the opinion of this House, it is desirable that His Majesty's Government should use its utmost efforts to stimulate international action for the study and eventual preparation of a treaty for the comprehensive reduction and limitation of naval, military and air armaments, including war material as well as personnel; and that it is desirable to co-ordinate the Defence Forces of this country.

Dr. Burgin claimed that there was nothing in this Motion which referred to disarmament in the sense of depriving the country of its methods of defence. He was talking in terms of reduction and limitation. It was a cardinal principle that full recognition at all times was given to the fact that there were small nations and groups of people the wide world over who looked to this country's Defence Forces for their protection. In fact this Motion involved the recognition that our armaments depended upon our commitments and that our commitments depended upon our policy.

He would remind the House that the governing words of the Pact of Paris were expressed in this form:—

That the parties are convinced that all changes in their relations with one another should be sought only by pacific means and be the result of peaceful and orderly process.

At the International Economic Conference in 1920 calculations by learned statisticians had been placed before the Conference showing that one fifth of the entire productive efforts of the nations of the world were subtracted from profitable purposes and were devoted to armaments, their upkeep and their manufacture.

The economic grounds were simply that the World was unable to afford the maintenance and upkeep of armaments on the present scale. We learn or we perish.

In 1914 the armaments of the World had been quite frankly preserved in order to deal with the possibility of the outbreak of war. In 1929 the real task before statesmen of all countries was to see whether there was a risk to ordered civilisation.

This Motion did not propose that this country should take a lead by still further reducing its own national armaments. He thought that we should spend more on research. The last cutting down of expenditure that he would willingly sanction would be the cutting down of expenditure dealing with research either in the construction of vessels or in the construction of aircraft or the mechanisation of the Army or in that great field of research, chemical warfare.

The question which struck every student of this subject very forcibly was whether a battleship was still the most profitable method in this country of spending £8,000,000. It was admitted a liability from the moment that it was launched. It cost £500,000 a year in upkeep and replenishment and it obviously could not pay a dividend unless that dividend be in the form of protection or security.

He hoped that research would be devoted to the whole question of naval construction for it was a consideration whether the construction of battleships in these days of wireless, of controlled gunfire, of the possibility of hitting a target from a position entirely out of sight, was the best return in terms of defence for the money it necessarily cost.

With regard to military armaments we were witnessing a change from the old Army of the foot-soldier to an army of a mechanised character, to machines, to various forms of rapid transport, and there was taking place, consequently, in our arsenals, something of the character of that which would take place whether there was a very much bigger reduction of armaments or not. There again there seemed to be a field for very considerable research.

Those whose professional or business occupations necessitated flying from one European capital to another were conscious of the enormous developments that were taking place with regard to civil aviation. Those who remembered the old Badische Analin-und-Sodafabrik at Ludwigshafen as a mere producer of dyestuffs and then as the tremendously powerful munition factory from which gas-filled bombs emanated—those who had those recollections, thought with what ease a machine-gun could be installed in a pilot's cockpit in a three-engined air liner and they wondered whether the difference between a civil aeroplane and a military aeroplane was very much more than the difference of the letters on its side or the colour under its wings.

The days of the armoured aeroplane were yet to come in any real sense and although civil aeroplanes were different in their character, because of their passenger, mail, and freight-carrying possibilities, from the military aeroplane, the similarity between the two was sufficient to alarm the ordinary man in the street. Alarm of that kind was far more likely to be a serious obstacle to the reduction and limitation of armaments than the well-founded objection to the aeroplane itself.

One country could not disarm in a world that was armed. Why should there not be local disarmament? Why not deal in a particular locality with the disturber of the peace? Why should there not be some mutual agreement between the countries concerned to reduce and limit their commitments to the minimum possible? This had been done with Central American States. He thought it could have been done with profit with the Scandinavian countries and with an inland sea such as the Mediterranean. The Suez Canal could, perhaps be brought under some similar conditions. He hesitated to suggest it for the Balkan countries.

In dealing with this question of reduction and limitation of armaments at a time when unemployment was rife he had devoted consideration to the question of those who would be displaced through any such agreement and his broad suggestion was that, inasmuch as the dockyards and arsenals had only one customer, the Government, the Government should ration their programme of orders so that there should be continuous work and that when there was a reduction of personnel, care should be taken to attract to the locality some alternative industry.

Those who had looked into the matter were of opinion that the co-ordination of the Defence Forces of this country would be a step in the direction of rendering reduction and limitation of armaments more possible and more easy to attain.

Recent debates in the House on the subject of a Ministry of Defence had made it appear that such a Ministry would make for economy. He would not suggest doing away with the present branches of the Navy, Army and Air Force, so much as the creation of some body above them which would deal with all three.

MR. A. E. GLASSEY (Liberal Member for the Eastern Division of Dorset), who seconded the Motion in a maiden speech, said that he rose in accordance with a resolve made with himself in the mud and the blood of the Flanders battlefield, to take every means within his power to persuade men to bend their whole energy and to lend their whole intelligence to finding a better way of settling international disputes than by having recourse to arms.

Everyone knew that peace was a far-off ideal. Peace in our time was not a possibility. While there were mad dogs among the other nations it would not be serving the cause of peace for this or any other country to dream of total disarmament, leaving themselves at the mercy of these mad dogs.

War did not settle anything. He asked the House to imagine a dispute between himself and the giant Italian boxer which would not be of his seeking but it might happen. The boxer might be wrong in every particular and he (the speaker) might be absolutely right in everything he claimed and stood for but, according to the war method, they would decide to settle their differences by a bout of fisticuffs. He would go into training for running, but in the narrow circumference of the ring not a great amount of time would elapse before he was caught and then he would forsake the perpendicular for the horizontal. Would that prove the boxer right and the speaker wrong?

Disarmament must be the effect and not the cause of peace. It was no good lopping off battleships from the Navy, or battalions from the Army or squadrons from the Air Force unless by so doing, or as a reason for so doing, one was lopping off a commensurable amount of war spirit from the hearts of the people.

He did not agree with those who thought you could best preserve peace by maintaining a mighty Navy and a colossal Army. There would be too much temptation to try it out. A big Army and a mighty Navy created envy, suspicion and distrust among all neighbouring nations.

The maintenance of our present forces was costing £200 a minute and we did not know where to turn to find a few paltry millions to support the necessary social services.

Returning to the subject of the co-ordination of the Forces, he said that a year or so ago he had visited the Gallipoli battlefields with a man who took part in the early bombardment of the Dardanelles forts by the Fleet, and his friend had said:—

"When our Fleet bombarded those forts the gunnery officers climbed to the top of that hill to 'spot' for their gunfire on the forts, and the battalion of men landed at that time could well nigh have marched through the Peninsula."

Lack of co-operation between Army and Navy, the loss of hundreds and thousands of lives, the pouring out of some of the best blood of Britain and her Colonies, and the end—tragedy, and only the indomitable courage of the men who fought had formed the little bit of redeeming feature of the whole thing.

REAR-ADMIRAL BEAMISH (Unionist Member for Lewes) said that as long as we retained an Army, a Navy and an Air Force we must have the very best of these three Services and they must be as efficient and as perfect as possible. The reasons that impelled people to propose a Ministry of Defence were, efficiency and economy, the fact that we now had an Air Force, and the fact that the Dominions were now part and parcel of a Council that decided the operations of war very largely and certainly the policies that led to and controlled war during its operation.

Efficiency in the Fighting Forces was never sufficiently regarded during the aftermath of a great war. Economy was very natural and proper, but we must be most careful how we economised in the insurance that we must provide for the country.

He held the view very strongly that the Air Force as a separate Ministry should cease to exist. We had no more right to have a separate Air Force than we had to have a separate submarine service in the Navy. Brand new weapons tended to build a wall round themselves and it was the duty of statesmen to see that such a thing did not happen.

History teemed with examples of the failure to co-operate. Up to 1914 co-operation and co-ordination between the Naval and Military

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Forces of this country had been nearly non-existent. The War had produced an enormous improvement. The first step in the right direction had been the creation, late in 1914, of the first War Council. In 1917 it had been gradually reduced and we had had the second War Council. That had culminated in the Imperial War Cabinet.

The Navy had no staff of any kind until 1912 and he believed that it was not until about 1904 that the Army or the War Office provided its own staff. The organisation of the Imperial War Cabinet continued to function to-day and we had a fine organisation now for any type of war without anything in the nature of creating the difficulties and dangers of a Ministry of Defence.

A Ministry of Defence required first of all a super-man. He did not know of any on the Government benches. They might know of one themselves.

A Minister of Defence would be a constant menace to the Prime Minister of any party because it would be an extremely difficult thing for the Prime Minister to controvert and counteract the energies of a man so highly placed as to control three great Departments of State.

Lt.-Cdr. Kenworthy asked why it would be more difficult for the Prime Minister to controvert one super-man than three super-men.

Rear-Admiral Beamish did not think there were three super-men in the Cabinet. He urged that the present system of retaining the Admiralty and the War Office should continue but that the absorption of the Air Ministry should be effected thereby improving the efficiency of the Army and Navy. [Well, of course, if the absorbed R.A.F. were appointed to run the Navy that might be so.—Ed.]

Major C. R. Attlee (Labour Member for the Limehouse Division of Stepney) said that Admiral Beamish was an argument for a Ministry of Defence because here was a man who had been brought up in the Navy and wanted to scrap the Air Force. He expressed the fear that Mr. Winston Churchill might be put in the position of the super-man over the three Services.

He thought we ought to build up a General Staff that would think in terms of all three Services and a General Staff that would think in terms of defence not war. He would like to see a Minister set apart to preside over the Committee of Imperial Defence.

He did not think that the machinery of the Government should be overloaded with seven Ministers of the Fighting Departments. The Committee of Imperial Defence had to function with a staff which were adherents to three separate departments. The Empire was rapidly becoming a rather loose federation in which the various parts of it took a greater part in their own defence. Sooner or later we should have to have some co-ordination.

The Rt. Hon. D. Lloyd George (Liberal Member for Carnarvon) said that the three Secretaries of State supported each other's estimates, whatever their merits might be, which was thoroughly bad. It was not the best case that won between Admiralty and War Office and Air Ministry, it was the best wangler every time.

No Government had come to a definite conclusion as to which of the branches of the Services it was most vital for the country to concentrate upon and develop. They had never faced the question because it was not the business of any individual Minister to think out the problem.

The Rt. Hon. Sir Samuel Hoare (Unionist Member for Chelsea, and Secretary of State for Air in the last Government) said that not half enough had been said about air armaments in these discussions about armament. He regarded the growth of our armaments as the greatest of all the dangers with which the future was faced. The air arm in the hands of an unscrupulous aggressor might be brought into play in the course of a few hours, and long before this moratorium period could be made use of, irreparable damage could be done to the civil population of some neighbouring country. That in itself made the development of the air arm the most sinister of all the developments in the disarmament question, and particularly sinister for a country like ours, in which the capital was in proximity to the frontier and in which the civil population was concentrated between the capital and the sea.

Comparing the figures for the year 1925 and the figures for the present time he found that the air expenditure of Italy had risen 28 per cent., that of France had risen 92 per cent. and that of the United States, a country that was totally immune from this form of attack, had risen by no less than 126 per cent. Our own expenditure had actually gone down 10 per cent.

He denied that during his period of office the Service Ministers had entered into a conspiracy to support each other's estimates. He did not want to exclude the possibility at some time or another of a Ministry of Defence being created and suggested that there was not, at present, a sufficient body of common thought between the three Services to justify the initiation of a Ministry of that kind here and now. While he was in office considerable advances were being made towards a better centralisation. They had in operation what was called the "agency system" under which the Service that bought the largest quantity of some commodity or performed the greatest amount of duties in a certain sphere of defence, undertook those duties for the two other Services.

The Chiefs of Staff Committee had been organised during the last Parliament. Every question in the field of Defence was now referred almost automatically to the three Chiefs of Staff for the purpose of getting, not their individual opinions upon it but their joint opinion. Constant use had been made of this very valuable opportunity of obtaining a joint opinion from the three Chiefs of Staff.

He believed that the whole problem of defence was progressing much further than the scope of the three Service departments. War now was a national effort, not simply an effort of trained armies. Defence to-day was a problem that went far outside the boundaries of the three Defence Services, and a Ministry of Defence would merely create a super-bureaucracy, whereas what was really wanted was the closest possible co-operation between the three defence departments and the other great departments concerned in modern problems of defence—the Foreign Office, the Dominions office, the India Office, the Board of Trade and so on.

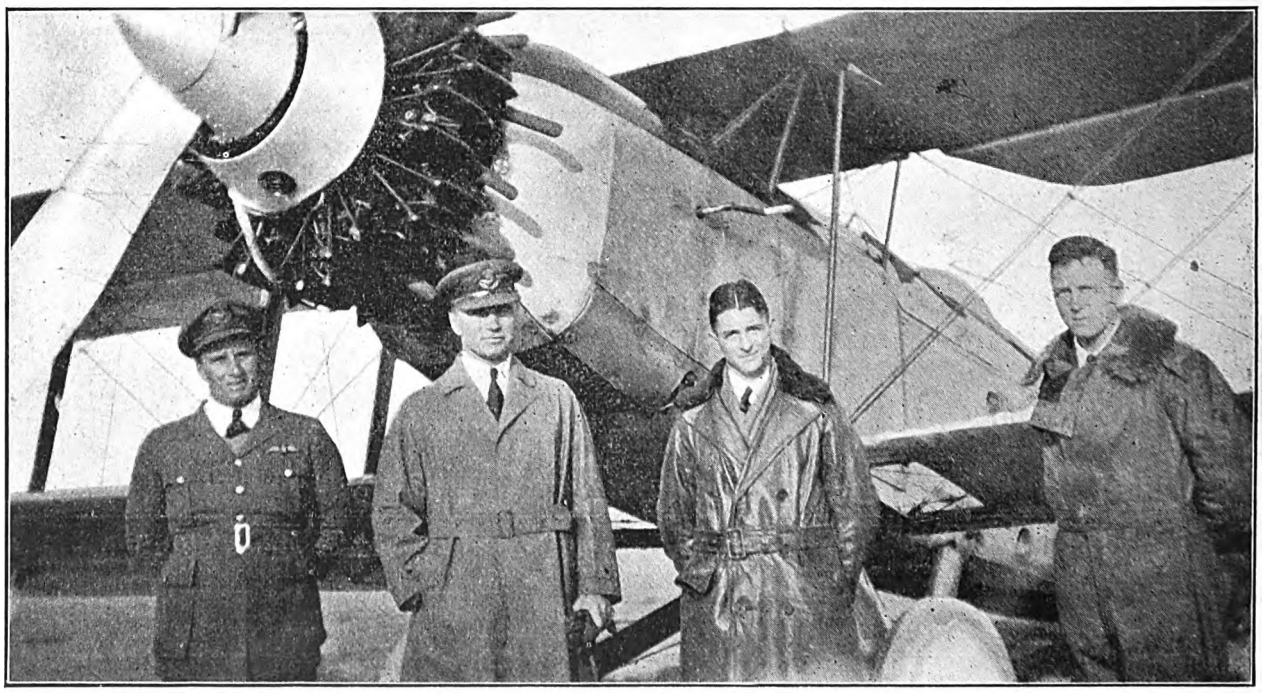
A freer substitution should be made of one arm for another where it could be shown that one arm could undertake a duty of national defence more efficiently and more economically than the existing arm which was undertaking it. An example had been the substitution of Squadrons of the R.A.F. for troops in 'Iraq and the Middle East.

Major J. W. Hills (Unionist Member for Ripon) said that nobody knew whether the money voted for defence was being spent to the best advantage and nobody could say how it should be spent unless he had control of all three Services.

Lt.-Cdr. Kenworthy (Labour Member for Kingston-upon-Hull) said that he did not think that the Sub-Committee of Chiefs of Staff was sufficient. Chiefs of Staff had far too many administrative duties. What was needed was a combined General Staff. The College of Imperial Defence was the beginning and from that College a combined General Staff could be made, including Dominion and Indian representatives. That would do something towards the co-ordination of strategy.

MR. MONTAGUE'S CONTINENTAL TOUR.

In the House of Commons on Feb. 5, in reply to a question by Capt. Crookshank, the Under-Secretary of State for Air said that the charge upon public funds as a result of his recent tour of the Continent, including the expenses of the Deputy Director of Civil Aviation who had accompanied him, had been £75 14s. 4d.



TOWARDS THE SOUTH.—The O.C. No. 45 (Bomber) Squadron, R.A.F., Sq. Ldr. F. J. Vincent, D.F.C., and the Adjutant, Flg. Off. A. R. Combe, with Messrs. Thorne and Haines of the Air Survey Co. Ltd. and their Fairey III.F (Jaguar) at Helwan, while the last-named were on their way to the Southern Soudan.

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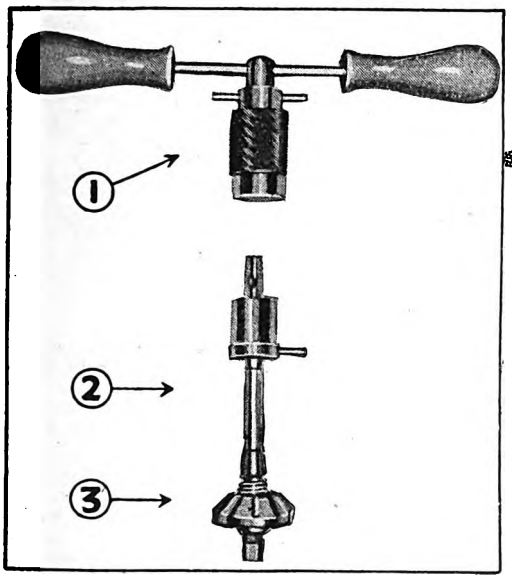

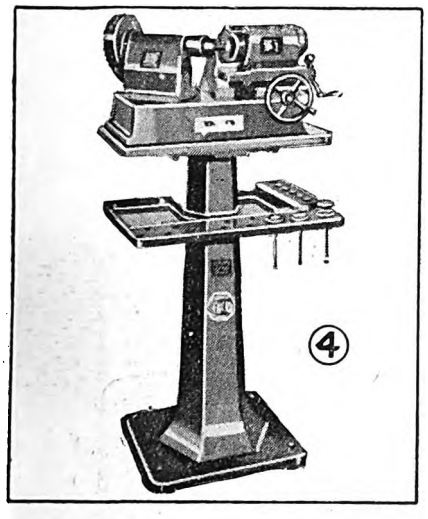

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D.A.

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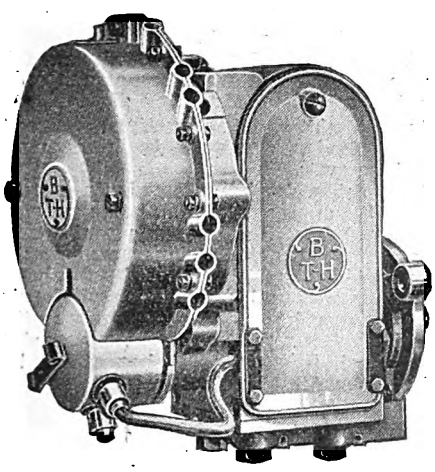
B T-H Magnetos

are fitted to the Rolls-Royce "Condor" engines of the

R.100

the fastest airship in the world

They were also fitted to the R.34, the first airship to cross and recross the Atlantic in 1919, and practically every achievement in the Air secured by Great Britain has been gained with the help of B.T.H. Magnetos.



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soundness by satisfactory flight tests. Last summer a Simmonds Spartan with this engine flew at Hamble and was illustrated in The Aeroplane for July 24, 1929.

The claims for this method are that there are no excessive rubbing-velocities or highly-loaded bearing-surfaces. If the system used in the Fury be analysed, one will find an entirely normal range of friction-velocities and bearing loads.

A 60 h.p. Fury with five cylinders is now being prepared for type test. The bore is 3 7/16 in. and the stroke 5 in. These cylinders follow proven practice and have cast-iron liners shrunk into aluminium-alloy heads.

There are three valves in each head, one exhaust and two inlet. They are of quite normal type and are operated by rocker-arms on the cylinder heads. These rockers are moved by push-rods with hardened steel balls at both ends.

The rods are operated by roller-ended tappets which are moved up and down by two-lobed cams running at one-quarter engine-speed and driven in the direction reverse to that of the engine by epicyclic gearing off the crankshaft.

The induction system has a carburettor placed, on the centre line and below the crank-case, in the front of the engine. This feeds by way of a two-branched induction passage into an annular passage-way, cast integral with the crank-case. From this passage-way ducts lead to each cylinder.

The pistons, which are made of a special light-alloy, are of the slipper-type with three rings. The connecting rods are symmetrical and have a neat form of universal joint at each end. The reason for this is the complex motion of the star-member.

The crankshaft lies along the axis of the engine and is carried by two roller-bearings and one ball-bearing. The thrust both of the pistons and the airscrew, which in this engine work in opposite senses, are taken care of by a large thrust and journal ball-bearing of special design, placed immediately forward of the crank.

The crank-pin of this engine is one of its special features. Instead of being excentric and parallel to the shaft, it is set at an angle and actually crosses the centre-line of the crankshaft. It is called a "Z" crank, and perhaps an easier way to describe it would be to imagine a normal two-throw crankshaft with a single diagonal pin joining the two outside webs. Opposite each web is a balance of the usual type.

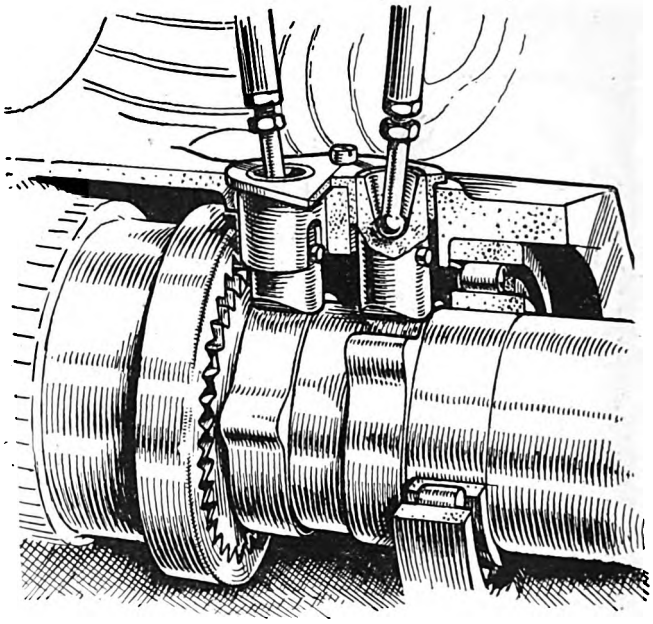
The end of the crankshaft carries suitable spur-gearing for driving the pumps and magnetos.

On the "Z" crank is a five-pointed star-member, each point of which is attached to the connecting rods through the previously-mentioned universal joints. This star-member has two white-metal bearings in which the "Z" crank can revolve.

There is one of these bearings at each end of the "Z" pin. These bearings embody four collars which take the thrusts caused by the power-stroke of each cylinder.

The easiest way to understand the motion of the star-member is to look down in plan on the crank when the top cylinder has just fired and the piston has completed half its down-stroke. There is obviously a compression force along one side of that particular arm of the star, tending to push the crank down and round. Similarly another force in the opposite sense along the other side of the arm tends to pull the crank up and round.

If one considers a little further, the need for preventing the rotation of the star becomes apparent. This is effected by a stabilising fork or torque-rod. This rod has a fork at one end which is hinged to the inside of the star member. The axis of the hinge passes through the middle of the crank-pin and is always at right angles to the axis of the pin, as



The valve-operating gear of the Redrup-Lever engine. Roller-ended tappets are now used.

the torque-tube is carried in a self-aligning journal-bearing at the bottom of the crank-case.

By this arrangement the star-member is free to oscillate about the hinge of the fork, and, as the fork can twist in its journal-bearing, the star-member can also twist about a vertical axis. Thus it can follow the wobbling motion caused by the rotation of the crankshaft and yet allow for the full torque-reaction of the engine to be taken through the torque-rod to the crank-case.

The lubrication system follows modern practice closely, with forced feed to all the bearing surfaces. The pressure and scavenging pumps are bolted to the after-end of the crank-case and are driven by gears from the end of the crankshaft.

The scavenging pump is approximately twice the capacity of the pressure pump which feeds into the after-end of the hollow crankshaft.

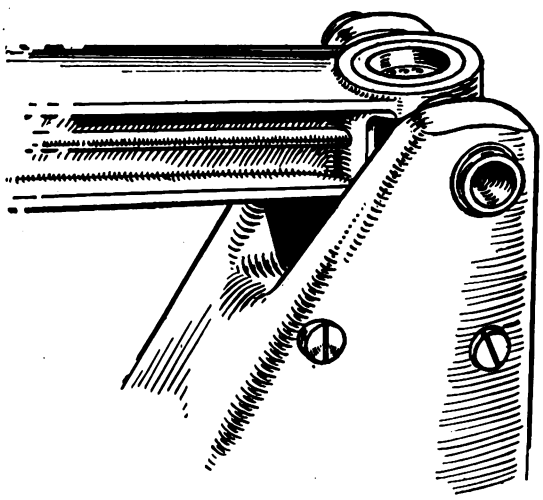
From grooves in the big-end bearings of the star-member the oil passes through to the universal joints at both ends of the connecting-rods. The cylinders are lubricated by splash. The oil drains back into the sump whence the scavenging pump sends it to the tank.

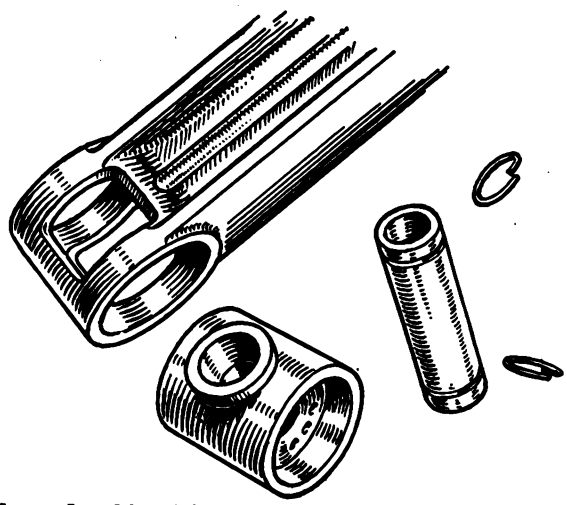
Two magnetos which fire two plugs per cylinder are fitted. One of them has an impulse-starter. Thet magneto drive has a vernier-coupling and shock-absorbing device.

The cooling system should prove interesting, because the hottest part of each cylinder, the head, is placed immediately behind the air-screw.

The most surprising thing about the Fury is its extremely small frontal area. This engine of 60 h.p. has a maximum diameter of 18 inches. A frontal area of this kind opens up new possibilities, especially for the designer who wants to put his engine in the wings or outboard of the fuselage.

The weight of the Fury now under production will be about 160 lbs.,—about 2.6 lbs. per h.p. The small cross-sectional area of the Fury and its low weight per horse-power should make it of wide appeal, so soon as it has satisfied the stringent demands of the Air Ministry.—T. J.





The universal joint of the connecting rods at the ends which join the star-member.

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THE LIGHT AEROPLANE
AND THE FLYING CLUBS.

OVER UNKNOWN AFRICA.

Africa is reputed to be a large place, but one is apt to realise with a little less haziness how large it is when one investigates the details of a recent flight by a young South African pilot.

By arrangement with an American Bishop, Lieut. J. R. King, of the S.A.A.F. Reserve, left Johannesburg on Dec. 17 last with a supply of anti-hydrophobia serum for the treatment of a woman missionary in Northern Angola, Portuguese West Africa, who had been bitten by a mad dog. The outward flight was over 2,000 miles, and was found to be so extraordinarily difficult that the pilot very wisely refused to fly in the face of Providence a second time, and chose to come home by a northerly route of nearly 4,000 miles.

The slotted Gipsy-Moth ZS-ABS which shared Mr. King's adventure was bought out of the S.A.A.F. about two months before, and had extra fuel tanks which raised its total capacity up to 30 gallons, a metal airscrew, and duplicated instruments throughout.

During most of the flight the front cockpit contained cases of petrol, but like the reserve supply on a car, this extra fuel was constantly being reckoned in with the main supply, and in consequence the pilot several times ran himself out, sometimes in unwholesome spots he had no desire to revisit in similar circumstances.

Two days after the start Mr. King's compass went into a spin, but he managed to find Windhoek, S.-W. Africa, and a German here stopped the compass playing the goat. The next landing was on the private drome at Tsumbe Mine, the northern terminus of the S.W. African railway system, on the edge of the Ovamboland native territory. This was the last circle Mr. King saw till he reached Boma, over 1,000 miles to the north, at the mouth of the Congo River. Between these two outposts of aviation lay miles and miles and other miles of dismal swamp, virgin forest, mountains and sand.

In the evening of the day he took off into the blue from Tsumeb with tanks oozing and the spare cockpit loaded with cases.

Things were looking fairly dull, as the financial reports blithely remark during a rock-bottom slump on Wall Street. Right up to the rim of the horizon Mr. King could see nothing but trees growing as close as the pile on velvet. On going lower to cheer himself up he discovered the forest was so dense that it was impossible to see the actual ground anywhere.

Meanwhile he was fighting a losing round against "gallons per hour," and inevitably the time arrived for the dip in the lucky bag. Just as his past was beginning to take shape, his eyes were opened, and a tiny patch of sand seemed to offer a landing among the trees. He side-slipped and stalled the Moth with desperate care into the "well," out of which he knew he would not be able to climb, and the machine came to the end of its run without a leaf having been touched.

It was useless to look for help in the dark, so the pilot made himself as comfortable as possible under the machine, in the river bed where he had landed. He was not by any means lonely however, as mosquitoes, ticks, bugs, and all the creeping things of the forest sought him out and proved wonderfully companionable.

With the daylight there arrived from every corner of the forest natives who had witnessed the miraculous descent of a winged god into their midst, and the accumulation of so much precious man-power gave the solution of his problem. Mr. King began immediately to dismantle his earthbound Moth, and one by one the detached units were lifted out of the gully. The last to go was the stripped fuselage.

Now began the strangest procession that has ever set the gay birds fluttering in the gloomy halls of a tropical forest. Some of the party bearing on their shoulders the delicate wings, others straining at ropes attached to the fuselage—a scene suggesting irresistibly a representation of the Volga Boatmen on the music-hall stage—the rescue gang stumbled along gloomy, tortuous tracks, chanting their helpful dirges while the ungainly silver fish swam sullenly in their wake.

Forest paths are never straight, nor is any thought paid, in the course of their construction, to the possibility that one day an aeroplane may have to pass that way. It happened, therefore, that a tree often checked the advance of the expedition, and as the fuselage would not bend for the tree, the tree had to bow before the fuselage. Thus and thus did the extraordinary caravan come at last, after 14 miles of patient collar work, to a clearing which Mr. King decided would do for a take-off attempt.

Nature had unfortunately omitted to equip the clearing with a petrol pump, or even an oil well, from the outpourings of which the hero might have distilled off the fuel he needed, with the aid of the tropical sun and a burning glass.

By some occult means the pilot conveyed to one of the native boys that petrol was his only joy at that moment, and the noble fellow trotted off after his palm had been crossed with silver, to return some hours later with a four-gallon tin of gasoline balanced expertly on his woolly head.

Apart from the gamble of the take-off the last obstacle now seemed to have been overcome, and shortly after this Mr. King accomplished the crowning miracle of the strangest 24 hours of his life by flying quite naturally out of the middle of a dense forest, to the uncontrollable surprise of a ground staff composed of rude and primitive negroes.

After a while Mr. King sighted a township and landed. It proved to be Lubango, whence his emergency supply of petrol had presumably come.

The Portuguese community had never before seen an aeroplane, but were surprisingly quick in the uptake, and the Moth was rapidly forced into service as a mail-carrier to Boma, at the mouth of the Congo, whence ships leave fairly frequently for Europe. In return for their hospitality the uninvited guest was happy to act as postman for these exiles, but when the Governor requested to be taken on a joy flight of some 900 miles, the embarrassed pilot was moved to adopt the *fortiter in re et suaviter in modo* attitude, which, translated into tactful Portuguese, must have been a work of some magnitude.

Though thwarted thus, the Governor maintained the dignity of his position to the last, and calling out a battalion of convict labour, ordered a dry river bed to be cleared and levelled to enable Mr. King to take off easily. The Moth got off without difficulty and headed once more into the unknown North.

A high range of mountains running parallel with the coast had to be crossed before he could land at Benguella, the next refuelling point. As the crest of the range was hidden in cloud he made a guess at the probable height and disappeared from view. Finding himself flying straight into the side of the mountain he turned rapidly and climbed, still in cloud, for a second shot at the obstacle.

THE PRIME MOVERS.—The Bishop, Mr. King, and the Gipsy engine.

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Still he was too low, so in exasperation he pulled the stick back into his centre-section and went through the top layer of cloud like a Bulldog with rabies.

At this height no mountains were to be seen, nor any landmark whatsoever, so he turned west on a compass course intending to strike the coast and follow it north. Allowing time enough to ensure that he would not dive through the clouds and impale himself on the local Kilimanjaro, Mr. King put his nose down on the other side of the range and shot through into the underworld, to discover that a strong current above the clouds had carried him over the coast and well out to sea.

Once more he circled, and picking up the line of the beach turned north, landing finally with all his petrol exhausted on a narrow strip of sand just outside Benguella on Lobito Bay.

Following the coast was now a simple matter, and at the port of Loanda the pilot turned inland and flew over a light railway which terminated at Malange, the settlement to which the anti-hydrophobia serum had to be delivered. On advice given at Loanda, the pilot landed some distance before reaching Malange and sent the serum down to the end of its journey on a hand-trolley, while he returned to Loanda.

While mapping out his course for home, Mr. King was approached by an American woman whose husband was prospecting for oil in Angola. Her life's desire was to fly to South Africa, and as she represented, so to speak, a "paying load," he agreed to take her.

The lady, who had fortunately been brought up in Texas instead of Boston, bundled a few things (an amazingly literal few for a woman) into a brown paper parcel as big as a largish water-melon, bought a huge sun helmet and garbed herself in tweeds. Finally she climbed into the front cockpit which had previously contained petrol cases, and the return flight began.

The estuary of the Congo River was sighted on Christmas Day. Steam was rising off the water and the marshes along the shores under the heat of the sun, and the island-studded stretch of water was so wide at this point that the farther shore could not be seen. Mr. King and his passenger had their Christmas dinner at Boma, the port at the mouth of the Congo, and the terminus of the Sabena air route through the southern Belgian Congo.

Once on the Sabena line Mr. King felt, although he was more than 3,000 miles from home, that the worst of his troubles were behind him. There are properly prepared and maintained landing grounds about every 20 miles all the way from Boma to Elisabethville. There are miniature Croydons every 200 miles or so, equipped with hangars to house three Handley Pages, each with a large hotel, workshops and stores. The service is so efficient that in the four years it has been operating not a single passenger has been hurt.

Although over the Congo in the Summer it is only possible to fly between 5 and 6 a.m., and between 11 a.m. and 2 p.m., owing to morning mist and afternoon rains, the Moth made good progress as far as Bandundu, after which point marauding bands of tornadoes were encountered, with which it is very stupid to chance one's arm.

Near Kanda Kanda, halfway along the route, Mr. King unsuspectingly found himself enveloped on all sides by tornadoes which appeared to be converging on his machine. He risked pulling its wings off with a plummet landing in elephant grass which from above had looked as innocent as the Sussex Downs. The tornadoes eventually sheered off, and when a band of inquisitive natives appeared on the spot the pilot set them to cutting a clearing through the grass, which was so tall that the Moth was completely hidden from anyone standing 30 feet away. The "elephant hay," strewn over the boggy ground, made a reasonably firm surface for a take-off.

At Elisabethville the Sabena route ends, and Mr. King continued to fly down the railway into Northern Rhodesia, making the Victoria Falls (Livingstone) in one day—nine hours' flying.

Pilots from the Union are well acquainted with the conditions between the Northern Rhodesian copper mines and the Rand, so that the last stage of his journey formed rather an anti-climax to the unknown risks he had to face on the outward flight.

The whole trip took three weeks less one day, and on Jan. 6 the Moth landed without a scratch on its home aerodrome. The lady passenger was so delighted with her trip that she contemplated chartering the same pilot and machine to take her back to Angola.

Mr. King learned to fly on a Curtiss-engined Waco, of which he was part-owner while a pupil at the Ford factory in Detroit. On returning home to Johannesburg he took his "A" licence on Moths at the local Light Aeroplane Club, and is therefore claimed as a home-grown pilot. He has a record of some 600 hours in the three years since he took up flying.

THE GIPSY-MOTH IN THE U.S.A.

The American-built Gipsy-Moth, the production of the Moth Aircraft Corporation, of Lowell, Mass., will in future be made by the Curtiss-Robertson Airplane Manufacturing Co., at St. Louis, Mo.

The Curtiss-Robertson Co., and the Moth Aircraft Corpn. are subsidiaries of the Curtiss-Wright Corpn. and the consolidation of the two concerns is to eliminate duplication in manufacture. The Curtiss-Robertson plant is to be enlarged and the machinery from the Moth plant at Lowell will be moved to St. Louis.

Mr. Milton N. Warren, President of the Moth Corpn., will go to St. Louis as Vice-President and Production Manager of the Curtiss-Robertson Company.

ENGLAND—AUSTRALIA.

On Feb. 9 Flg. Offs. H. L. Piper and C. Kay, R.A.F., left Croydon at 06.30 hrs. in a Desoutter cabin monoplane (Cirrus-Hermes engine) in an attempt to fly to Australia. Both officers are New Zealanders and they have been granted three months' leave of absence to go home. They hope to fly to Sydney by easy stages and then go to New Zealand by boat before returning to this country.

The Desoutter monoplane is standard in all respects except that the cabin is arranged to accommodate two instead of three, and the remaining space is used to take an auxiliary petrol tank. The total fuel capacity of the machine is thus brought up to 53 gallons, which is enough for 850 miles.

The route they will follow will be by way of Lyon, Naples, Malta, Tripoli, Baghdad, Karachi, Calcutta, Rangoon, Singapore, Kupang, Port Darwin, and thence across Australia to Sydney.

FOR AUSTRALIA.—Flg. Offs. C. Kay and H. L. Piper, R.A.F., who left Croydon on Feb. 9, in a Desoutter monoplane (Cirrus-Hermes engine) to attempt to fly to Australia. They reached Lyon later the same day.

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THE ASSOCIATED LIGHT AEROPLANE CLUBS' GENERAL COUNCIL.

A Meeting of the General Council of Associated Light Aeroplane Clubs was held at the Royal Aero Club, 3, Clifford Street, W.1, on Thursday, Feb. 6, when the following Clubs were represented:—

The Royal Aero Club—Lieut.-Col. M. O'Gorman (in the Chair), Lieut.-Col. M. O. Darby and H. E. Perrin.
The Bristol and Wessex Aeroplane Club—R. Ashley Hall and Col. D. Robinson.
The Hampshire Aeroplane Club—Graham Gibbs and H. J. Harrington.
The Lancashire Aero Club—Maj. A. R. Goodfellow and J. C. Cantrill.
The Leicestershire Aero Club—R. C. Winn and H. Purt.
The Liverpool and District Aero Club—W. F. Davison.
The London Aeroplane Club—Capt. A. G. Lamplugh and The Hon. Lady Bailey.
The Midland Aero Club—H. A. Pepper and Major G. Dennison.
The Newcastle-upon-Tyne Aero Club—B. M. Dodds and J. H. Boyd.
The Norfolk and Norwich Aero Club—A. A. Rice.
The Nottingham Aero Club—C. R. Sands.
The Royal Aircraft Establishment Aero Club—P. N. G. Peters.
The Suffolk and Eastern Counties Aeroplane Club—Dr. J. Sleigh.
The Yorkshire Aeroplane Club—Capt. F. G. Wayman.

The following Clubs were unanimously elected to the General Council:—The Household Brigade Flying Club, The Leicestershire Aero Club, The Plymouth Aero Club.

A Communication from the Air Council on the subject of Royal Air Force assistance at Civil Flying Meetings in 1930 was considered. It was intimated that, subject to satisfactory proposals being submitted by the General Council, assistance might be forthcoming at four meetings this year.

The General Council, having considered the Programme of Meetings for 1930, decided that Royal Air Force assistance, subject to the approval of the Air Council, should be allocated to the following Flying Meetings:

Leicester (Leicestershire Aero Club), April 19.
Bristol (Bristol and Wessex Aeroplane Club), May 31.
Norwich (Norfolk and Norwich Aero Club), July 26.
Liverpool (Liverpool and District Aero Club, and Lancashire Aero Club), Sept. 20.

The question of Reciprocal Membership between the Associated Light Aeroplane Clubs was discussed. It was generally agreed that an arrangement, whereby members could join other Clubs at a reduced subscription, was desirable. It was decided that each Associated Light Aeroplane Club should submit its own scheme and a sub-Committee of representatives of the following Clubs was appointed to report on the various schemes to the next meeting of the General Council:—Bristol and Wessex, Hampshire, Lancashire, Leicestershire, London, Midland.

THE HAMPSHIRE AEROPLANE CLUB.

Despite indifferent weather conditions the Club has started off with 112 hours' flying during January and five new members have joined. Six months of the Club's second year under the revised subsidy arrangements have now expired and during this period 26 members have passed the "A" licence tests. In terms of cash this means that, together with the Flying Grant, we have, during the past half-year, earned £1,600, leaving another £400 to be earned by the end of July 1930.

The credit for training so many pilots is due almost entirely to Mr. Dudley who, for the past five months, has been instructing single-handed. Since Mr. Dudley joined the Club in July 1928 he has himself put in over 1,100 hours of dual instruction. If this is not a record it must be exceedingly near one, and the fruits of Mr. Dudley's hard work, to which the highest tribute is paid, is shown in the figures given above. An assistant instructor is being appointed.

The Club wishes to give a word of praise to the Engineering Staff. It is obvious that the work of Mr. Lenny and his assistants has been exceedingly hard and very exacting, and but for their willing co-operation it would have been impossible for the Club to have done so much flying.

The Club is also appreciative of the loyalty shown by its licensed pilots. These alone, during the six months just ended, have put in over 230 hours' solo flying.

A hut is being erected on the aerodrome for the use of members and friends, and in the Clubhouse itself a billiard-room is being built. This work is being done entirely by the staff under the Club's versatile rigger, S. W. Riches.

The social season opened with a highly successful party recently, and another will be held in the near future.

Altogether, under the vigorous leadership of Mr. Grahame Gibbs, the Managing Director, and Capt. Kirby, Chairman, the Club has made a very auspicious start in 1930.

THE NORTHAMPTONSHIRE CLUB BALL.

The Northamptonshire Club's Annual Ball was held at the Salon de Danse on Jan. 24, and was a great success. Approximately there were 400 present. The "Savoy Band" were kept continually busy playing encores.

The Committee wish to express their thanks to those who supported them and their regrets in having to turn down so many applications for tickets and in particular to members of other Clubs and private owners who applied too late.

GLIDING.

An Informal Gliding Dinner.

On Friday, Feb. 21, at 19.30 hrs., an informal dinner and discussion will be held at the St. Ermin's Hotel, Caxton Street, Westminster. The cost of the tickets will be 6s. 6d. each.

This dinner has been arranged by the Royal Aeronautical Society in co-operation with the Royal Meteorological Society to enable people interested in gliding to meet Dr. Georgii and Herr Stamer.

Gliding enthusiasts will welcome the opportunity of meeting informally the leading German authority on gliding. After a dinner of this kind much valuable information is given and exchanged in conversation.

Those who were interested in gliding eight years ago at Itford will be interested to find how it is that German gliding has progressed so far though it has died out in England. People will be able to find out how it is that Kronfeld in his sailplane has flown over 90 miles in a straight line and reached a height of over 7,000 ft.

The chair will be taken by Colonel the Master of Sempill. He will be supported by Mr. K. Lempfert, who is President of the Royal Meteorological Society. Members of the two Societies may bring guests to the dinner.

Gliding enthusiasts who are not members of these two Societies should write to the Secretary of the British Gliding Association at 7, Albemarle Street, and ask him to help them. The alternative is to find a friend who is a member of the R.Ae.S. or of the R.M.S. and go as the friend's guest.

Applications for tickets should be made to the Secretary, The Royal Aeronautical Society, 7, Albemarle Street, W.1.

The London Gliding Club.

The Inaugural Meeting of the London Gliding Club will be held on Feb. 20 at 19.45 hrs. at Dr. Williams' Library, 14, Gordon Square, W.C.1. The nearest stations are Euston Square or Warren Street.

At this meeting members will hear the report of the provisional committee. They will also have the chance of approving or condemning the actions of the provisional committee.

Members will be able to examine the arrangements already made for actual gliding and will learn of the selected sites. There is the likelihood that a volunteer launching crew will be selected for test flights to be made at the following week-end.

The meeting will be open to members only. Prospective members should get in touch with Mr. S. O. Bradshaw, 1, Deansbrook Lane, Edgware, Middlesex, from whom full particulars of membership can be had.

The Gliding Contest at Darmstadt.

The Research Institute of the Rhoen-Rossitten Gesellschaft are organising an International Gliding Congress to be held at Darmstadt on Mar. 8 to 10. This gathering is to mark the tenth birthday of the Sail-plane Movement.

The Congress will discuss the principles and problems of soaring flight especially in relation to actual sail-planing and the management of sail-plane schools. Another aspect which will receive consideration is the relation between soaring flight and that produced by engines.

A number of well-known experts have promised their willing co-operation. A more detailed announcement will be made later.

Gliding in Lancashire.

The Lancashire Aero Club are to have a Gliding Section.

The leader in the January number of *The Elevator*, the official organ of the Club, is devoted to this subject, and in it Mr. Alan Goodfellow discusses the sport.

He draws attention to the difficulty of obtaining a glider at a reasonable price in a reasonable time from British manufacturers. One would suggest that liaison should be effected with the British Gliding Association.

The two alternative methods of obtaining gliders outlined by Mr. Goodfellow are either importation from Germany or home-construction with the technical and practical assistance which has been offered by A. V. Roe and Co. Ltd.

Another difficulty to be faced is the form of the Gliding Section. Are members of the public to be allowed to become Glider Members at a more or less nominal subscription? Is the Lancashire Club to provide the necessary gliders and limit their use to qualified flying members at so much per flight? Shall a few enthusiastic members of the Club get together and start experimentally?

To which questions, one ventures to say, the present organisation of existing and experienced gliding associations offers the correct answers.

Gliding Exhibitions.

Herr Edgar Dittmar, the famous German glider pilot, would like to visit England at any time to give exhibitions with his famous record-breaking glider *Schloss Mainberg*. People who might be interested in paying for such exhibitions are invited to write to him at Schultestr., 3, Schweinfurt, Germany.

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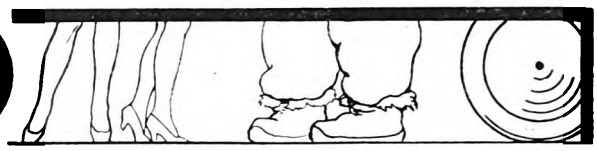
LESS MUD



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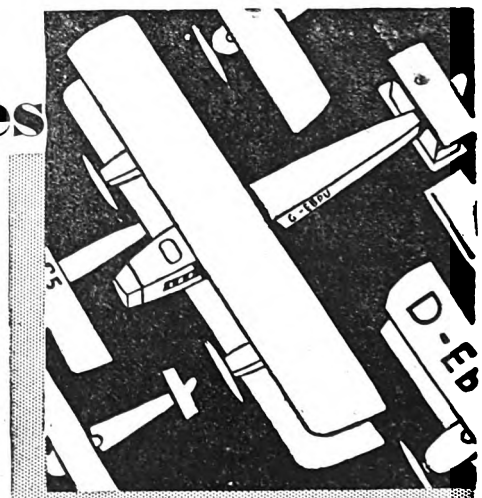

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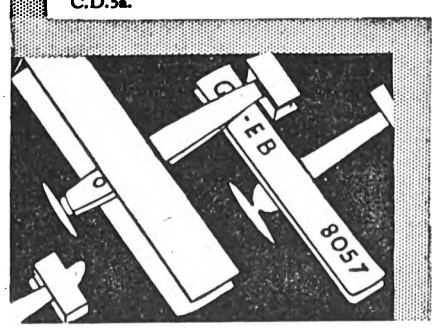

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COMMERCIAL AERONAUTICS.

SIR ALAN COBHAM'S RETURN.

Sir Alan and Lady Cobham arrived at Southampton on Feb. 10 in the s.s. *Arundel Castle*. He stated that all the outstanding arrangements have been settled in connection with the new Imperial route to the Cape. The only remaining need is the ground organisation.

This is being done by a survey party sent out by Imperial Airways Ltd., which started from the Cape and is now working towards the North.

Sir Alan stated that between twelve and fifteen machines should be used, each able to carry sixteen passengers. Flying-boats ought to be used over the Nile section and high-performance aircraft for the high-altitude aerodromes in South Africa.

The general idea is that the service is to be weekly at first but will probably become bi-weekly especially over certain sections. The entire route, except for a small section between Mbeya and Broken Hill, has been definitely selected.

The halts will be:—Cairo, Wadi-Halfa, Khartum, Mongalla, Nairobi, Mbeya, Salisbury, Johannesburg, and Cape Town. The journey is to take eleven days and the service should be started before the end of this year.

Sir Alan is starting on Wednesday of this week to inspect some 25 aerodrome sites left over from his tour of Great Britain last year.

LAW, ORDER, AND DECENCY.

The Guild of Air Pilots and Navigators is taking steps to prevent breaches of the rules of Air Navigation. It considers that such practices as low flying over towns, stunting over places where members of the public are assembled, etc., are greatly to be deprecated as being calculated to bring the professions of Air Pilots and Air Navigators into disrepute.

Such breaches are at times committed for commercial purposes to the disadvantage of those engaged in commercial aviation who refuse to contravene regulations.

The Guild has been asked by the Air Ministry to help in repressing such practices.

Will any person, therefore, who sees cases of dangerous flying communicate with the Clerk to the Guild, 61, Cheapside, E.C.2, and give the registration lettering of the aircraft, time, place and other particulars of the occurrence.

SPEEDING-UP MAYORAL TRANSPORT.

On May 29 the Lord Mayor of London is to be received by the President of the French Republic in connection with a visit by the City Corporation and other municipalities to "adopted" villages in the devastated areas of France.

On May 31 the Lord Mayor hopes to fix a date with the Master Printers' Federation in Edinburgh. The Mayoral Coach won't do the journey in the time, so the Lord Mayor is trying to get an aeroplane.

MUNICIPAL AERODROMES.

In the House of Commons on Feb. 5, in reply to a question by Mr. T. Lewis, the Under-Secretary of State for Air said that he was aware that difficulties had arisen in certain cases with regard to the purchase of land for municipal air ports. A general power to acquire land for aerodromes by agreement was conferred upon local authorities by Section 8 of the Air Navigation Act, 1920, and some municipalities had taken compulsory powers for this purpose in special Acts which they had promoted. He was not in a position to say whether it would be possible to grant them such powers by means of any general legislation, but the question was receiving consideration.

CUSTOMS AIRPORTS FOR THE NORTH.

Air Ministry General Notice to Airmen No. 5 of this year states that a portion of the River Mersey has been approved as a Customs aerodrome for marine aircraft only. Also, Chat Moss is approved as a Customs aerodrome.

Thus both Liverpool and Manchester now possess Customs facilities which should increase the airborne traffic between the Irish Free State and the Continent.

The portion of the River Mersey approved for this purpose is bounded on the north by Rock Ferry Pier, by a line running true east from the eastern end of that pier, and on the south by a line true west from Garston Docks.

LICENSED AERODROMES.

In the House of Commons on Feb. 5, in reply to a question by Mr. Everard, the Under-Secretary of State for Air said that the number of licensed aerodromes for civil aircraft in Great Britain was 77 at the beginning of 1929 and 90 at the beginning of 1930. During the course of each year a large number of aerodromes were normally licensed for short periods, generally for joy-riding purposes: thus the total number of aerodrome licences issued in 1928 was 206 and in 1929 320, apart from renewals in each case.

THE ACCIDENT AT MARDEN.

On Feb. 10, about 13 hrs., a machine belonging to Air Union had a forced landing at the emergency aerodrome near Marden. The machine apparently stalled when near the ground and the wreckage caught fire.

There were six persons on board, three crew and three passengers. Two of the passengers were killed, the crew and one passenger escaped with injuries from the wreckage.

Reports state that the surviving passenger says he was told by one of the crew before the crash that something had gone wrong with the tail or rudder controls. *The Times* states that the pilot found the rudder giving trouble.

The names of the killed and injured are:—

KILLED.—Mr. A. A. Hodges, schoolmaster in the Royal Navy, aged 28, of Alexandra Road, Sheerness, and Mrs. Hodges, his wife, aged 21, who were returning from their honeymoon in Paris.

INJURED.—M. J. Nevot, pilot; injuries to head and face. M. Lesolliec, mechanic; shock and minor injuries. M. Albaux, mechanic; fractured ankle and shoulder. Mr. Hugh Curson, Clifford Avenue, Ings Road, Hull; injuries to head and leg.

Lord Thomson, Secretary of State for Air, has sent the following message to M. Laurent Eynac, the French Air Minister:—

Air Council have learnt with profound concern of accident to Air Union Goliath aeroplane at Marden, Kent, on its flight from Paris to London, and express deep sympathy at loss of life involved.

[At the time of going to press exact information is lacking, but in the photographs of the wreckage the machine appears to be a Lioré et Olivier.—ED.]

FRENCH AIR ACCIDENTS.

According to the Paris correspondent of *The Times* the discussion on the Budget estimates for the French Air Ministry was begun on Feb. 3 in the Chamber.

In the course of a long and very diffuse debate the Air Minister, M. Laurent-Eynac, was severely criticised on the ground that the French air services, both military and commercial, lagged far behind those of other nations. In particular, it was alleged that hardly any progress had been made with seaplanes. Several Deputies attacked the policy of the Ministry with regard to the diversity of types in use in the French military air service. It was alleged that 17 different types of engines had been installed in a group of 56 units.

One Deputy stated that since 1920 France had ordered 332 different types of military aeroplanes, 130 types of seaplanes, and 371 types of engines. To the diversity of types was attributed the tale of accidents.

It was stated that between Jan. 1 and Dec. 31, 1929, there had been 34 accidents, in which 74 persons were killed and 28 injured. A large proportion of these was due to fire, and the Minister was urged to encourage experiments with heavy fuel in place of the highly inflammable light fuels in use.

Two Deputies put forward proposals for an air armaments conference on the lines of the London Naval Conference and advocated greater attention to commercial aviation.

EGYPTIAN JUNKETING.

On Dec. 28, the first Annual Staff Dinner of the members of Imperial Airways' Near East Division was held at Heliopolis House Hotel. The arrangements were admirably made by a Committee composed of Mr. S. Baxter (Chairman), and Miss Whelan, Messrs. Barritt, Goudy and Crosbie. Due acknowledgment is made of the courtesy of The B.T.H. Co. in lending panatropes for the entertainment arranged by Mr. Wilkinson.

There were about 60 people present, and the guests of honour were Mr. G. Woods Humphery, the General Manager of Imperial Airways Ltd. and Mrs. Woods Humphery.

Mr. Stewart Baxter, Engineer Superintendent, congratulated the staff on the brilliant way they had maintained and developed the services since 1927. He proposed Mr. and Mrs. Woods Humphery's health, which was cheered enthusiastically.

The General Manager, thanking the assembly for the hearty welcome he and his bride had received, drew attention to the growing importance of Imperial Airways. The success of the Company, he said, was due to the unfailing loyalty of the staff; their splendid team work lightened the task of organising the Company's affairs, and reflected great credit on everyone. He expressly included the wives and brides of the staff in his appreciation of work well done, adding that their influence was of the utmost value in making a man happy and proud of his job

Major H. G. Brackley (Divisional Manager) replying, thanked Mr. Woods Humphery for his encouraging words, and added that he was glad to have the opportunity to express thanks on his own account for the work of the staff.

After dinner, the guests danced until midnight, when the singing of Auld Lang Syne ended a very pleasant entertainment.

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HOW YORKSHIRE THINKS.

According to *The Bradford Telegraph and Argus* of Feb. 6, the Leeds City Council has agreed to the withdrawal for the time being of a recommendation that the Council enters into an agreement with the Corporation of Bradford for "the joint purchase of 242,038 acres at Yeadon for an aerodrome"!

National Flying Services made an offer some months ago to the Leeds and Bradford Councils by which they would become lessors and managers of the site. This was duly recorded in THE AEROPLANE at the time, and readers of this paper will remember the enthusiasm of all concerned while they were under the influence of the excellent lunch given by Lord Brotherton of Wakefield. Apparently after sober consideration the Leeds Council have withdrawn their previous agreement with the City of Bradford.

But this is the first one has heard of an area for aeronautical purposes covering over 378 square miles. *C'est magnifique, mais ce n'est pas un aérodrome.*

Still, Yorkshire is a big county.

STEEL WING STRUCTURES.

The Steel Construction of Aeroplanes. By Harry Harper. Price 12s. 6d.— From THE AEROPLANE Book Dept., Cannon House, Pilgrim Street, E.C.4.

The Steel Construction of Aeroplanes, by Mr. Harry Harper, has recently been reprinted. This booklet, which was first published about 1923, contains a brief description and history of the steel wing construction developed and used by Sir W. G. Armstrong Whitworth Aircraft Ltd.

The booklet opens with a survey of the first attempts at flight and shows how they were frustrated by lack of technical knowledge about structures, and the lack of an efficient power-plant.

As the War 1914-18 continued so the need to find a substitute for wooden spars became imperative. Attempts were first made to use steel tubes and then to develop built-up spars of special sections.

Mr. Harper outlines the methods developed by Sir W. G Armstrong Whitworth Aircraft, and explains the growth of each particular feature. In this he is aided by the clear and detailed pictures and sketches of Mr. Geoffrey Watson.

Two features of particular interest are the description of the method used to harden the completed spars; and the specially developed "pop"-rivetting. The former is a really brilliant idea and is achieved by gripping the ends of the spar in electrodes and turning-on a current of specified voltage [Or should it be watt-age?—ED.], which raises the steel to the required temperature and prevents its deformation.

IMPORTANT DATES.

Feb. 13.—Señor J. de la Cierva's lecture before the Royal Aeronautical Society.
Feb. 19.—Rugby Football, R.A.F. v. United Banks at Ealing.
Feb. 19.—Hockey, R.A.F. v. Middlesex at Uxbridge.
Feb. 19.—Dr. Georgii's lecture before the Royal Aeronautical Society.
Feb. 21.—Informal Dinner and Discussion on gliding at St. Ermin's Hotel at 19.30 hrs.
Feb. 21.—Boxing, R.A.F. v. Oxford University at Halton
Feb. 22.—Assoc. Football, R.A.F. v. Wycombe Wanderers at Wycombe.
Feb. 26.—Rugby Football, R.A.F. v. Oxford University at Halton.
Feb. 26.—Skill-at-Arms, R.A.F. College v. R.M.A. at Woolwich.
Feb. 26.—Hockey, R.A.F. v. R.N. and R.M. at Beckenham.
Feb. 27.—Mr. Rowledge's lecture before the Royal Aeronautical Society.
Mar. 5.—Wing Cdr. T. L. Leigh-Mallory's lecture before the Royal United Service Institute.
Mar. 6.—Major F. M. Green's and Mr. H. C. H. Townend's joint lecture before the Royal Aeronautical Society.
Mar. 8.—Rugby Football, R.A.F. v. Coventry at Coventry.
Mar. 8, 10.—International Gliding Congress at Darmstadt.
Mar. 10.—Herr Wronsky's lecture before the Royal Aeronautical Society.
Mar. 12.—Rugby Football, R.A.F. v. Civil Service at Halton.
Mar. 22.—Rugby Football, R.A.F. v. Army at Twickenham.
April 3.—M. M. P. Grimault's lecture before the Royal Aeronautical Society.
April 19.—Leicester Flying Meeting (Leicestershire Aero Club).
May 31.—Bristol Air Pageant (Bristol and Wessex Aeroplane Club). Official opening of Bristol Municipal Aerodrome.
June 9.—Northamptonshire Aero Club's meeting at Sywell Aerodrome.
June 10—15.—F.A.I. Conference, Paris.
June 21.—Annual Air Rallye at Haldon Aerodrome.
June 26.—Ipswich Air Pageant (Suffolk and Eastern Counties Aeroplane Club). Official opening of Ipswich Municipal Aerodrome.
June 27.—Annual Dinner, R.A.F. Dinner Club.
June 28.—Royal Air Force Display at Hendon.
July 5.—King's Cup Air Race (Royal Aero Club).
July 20—Aug. 7.—International Touring Competition.
July 26.—Norwich Flying Meeting (Norfolk and Norwich Aero Club).
Sept. 1—6.—Fifth International Congress on Air Navigation—The Hague.
Sept. 6—28.—International Aero Exhibition at Stockholm.
Sept. 20.—Liverpool Air Pageant (Liverpool and District Aero Club and Lancashire Aero Club).
Nov. 28—Dec. 14.—International Aero Exhibition at Paris.

CROYDON NOTES.

Sunday morning last was fine but chilly, and there was a general exodus from Croydon to remote corners of the Globe, started by Flg. Offs. Piper and Kay in a Desoutter monoplane, in which they left at 6.30 a.m. in an attempt to beat Sq. Ldr. Bert Hinkler's record to Australia,—or so the papers say, though they disclaim the intention.

Next the Fairey III.F took off, piloted by Mr. Kemp, bound for Uganda, and finally at 8 a.m. came Mr. van Lear Black's departure for Tokio in the 900 h.p. Fokker, *Free State of Maryland.* Arriving about 7 a.m. to see him off, guests found themselves drinking Mr. Black's health in a stirrup-cup of champagne, which they lowered cautiously into interiors as yet unlined with breakfast. Ancient thieves' slang vocabularies give "Wombledy cropt" as meaning "An indisposition due to unwise indulgence in wine," and the expression seems descriptive of some of the guests, who showed distinct symptoms of Wombledy croptitude until revived with porridge, kippers, bacon and tea.

On Saturday morning there was a delightful ceremony when Mr. Wilson, who used to fly *Geraldine* for *The Daily Mail,* led his new Desoutter monoplane to the font, where Mrs. Stevens, the charming wife of Mr. A. C. Stevens, a popular member of the K.L.M. Croydon staff, officiated with a bottle of bubbly and a hammer such as quarrymen usually employ for breaking enormous rocks.

Mr. Stevens is an American who is learning about European Aviation before taking up an important position with one of the best known Air Traffic companies in the U.S.A.

After the monoplane had been thus gracefully named *Avis* the party, which included all the nicest Aerodrome people, retired to the genial warmth of the hotel, where soothing symps of various sorts were supplied to them.

Another ceremony, this time of a somewhat obscure nature, is said to have taken place recently, when Aerodrome people were surprised to see Air Vice-Marshal Brancker tapping at the tiles of a new kiosk, said to belong to the Shell Co., with a bottle. Having broken the bottle and several tiles, the Vice-Marshal unleashed a number of Shell representatives, who departed for foreign parts.

Toast masters are not always as important, it would seem, as Tact Masters, and the Royal Aero Club amazed the habitable globe the other day when they invited the Duchess of Bedford and Mr. Barnard to a "Swarry" and completely ignored Mr. Bob Little, who, as Navigator, Engineer and second pilot to the "Spider," surely did a very great deal towards the success of the flight.

Even when Bob tried to buy a couple of tickets for the Swarry, he was curtly informed that there was no room. It would not have been difficult for a couple of members, or, better still, a brace of people who only show up on such occasion to stand down, especially as one knows numbers whose absence would lend enchantment to any banquet.—SPRY.

THE LONDON TERMINAL AERODROME.

ANALYSIS OF FIGURES FOR PAST WEEK.

Trips per Day.—Sunday, 5; Monday, 16; Tuesday, 18; Wednesday, 17; Thursday, 21; Friday, 16; Saturday, 21.

IMPERIAL AIRWAYS LTD.:
London—Egypt—India: London—Le Touquet—Paris—Basle—Zurich: London—Ostend—Brussels—Cologne and return: Machines 38, passengers 202, freight 13¼ tons. India Route: Inward, passengers 0, mail 655 lbs.; outward, passengers 0, mail 774 lbs.

AIR UNION:
Paris—London: Machines 35, passengers 110, freight 8 tons.

K.L.M.:
Amsterdam—Rotterdam—London: Machines 12, passengers 25, freight 4¼ tons.

SABENA:
Brussels—London: Machines 12, passengers 13, freight 2¾ tons.

DEUTSCHE LUFT HANSA A.G.:
Amsterdam—London: Machines 12, passengers 9, freight 1¾ tons.

MISCELLANEOUS:
British machines 4, passengers 10.
Foreign machines 1, passengers 0.
Total number of trips by British machines, 42, carrying 212 passengers. Foreign machines, 72, carrying 157 passengers.

COMPARATIVE FIGURES.

Week ending Feb. 8:
Machines, 114; Passengers, 369; Crews, 295; Total personnel, 664.
Corresponding week, 1929:
Machines, 84; Passengers, 269; Crews, 166; Total personnel, 435.
Corresponding week, 1928:
Machines, 93; Passengers, 305; Crews, 171; Total personnel, 476.
Corresponding week, 1927:
Machines, 51; Passengers, 114; Crews, 84; Total personnel, 198.
Corresponding week, 1926:
Machines, 40; Passengers, 88; Crews, 51; Total personnel, 139.
Corresponding week, 1925:
Machines, 61; Passengers, 78; Crews, 70; Total personnel, 148.
Corresponding week, 1924:
Machines, 50; Passengers, 86; Crews, 78; Total personnel, 164.
Corresponding week, 1923:
Machines, 26; Passengers, 75; Crews, 49; Total personnel, 124.
Corresponding week, 1922:
Machines, 30; Passengers, 57; Crews, 47; Total personnel, 104.
Corresponding week, 1921:
Machines, 20; Passengers, 32; Crews, 35; Total personnel, 67.

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TRANSPORT OF ALL SORTS.

[*Transport Co-ordination,* a Study of Present-Day Problems. By K. G. Fenelon, M.A., Ph.D. 137 pages, 28 statistical tables. P. S. King and Son, Ltd. Supplied by The Aeroplane Book Department, Cannon House, Pilgrim Street, E.C.4. Price 6s. 6d., post free.]

This book should prove extremely interesting to Aviation folk, not on account of the very sound study of Air Transport problems which it contains and for which the Author thanks The Aeroplane in his preface, but because it deals largely with surface transport, about which Air Traffic officials usually know very little.

In these days when every Railway Company has a subsidiary Air Company sitting like some monstrous crow upon the fence waiting until the Aviation worm is adipose enough to form an adequate meal, it behoves Commercial flying to know "what the other bloke is a-doing of."

Railway Companies talk glibly about taking over air transport when the time comes, though perhaps Air Transport may take over the Railways. One never knows.

The Author's section dealing with air co-ordination with other forms of transport is well worth serious attention. And finally we owe Mr. Fenelon a debt of gratitude because he has neither treated Air Transport as a matter of no importance and no future, nor has he gone into ecstasies over the wonderful future when the skies will be darkened with aircraft carrying everything from pig-iron to passengers, and other transport will lie rotting in sidings, garages or docks.

He has estimated the present uses and the future prospects of Air Transport, especially in relation to other forms of transport, in a way with which most Aviation people will thoroughly agree.—H. S. L.

AN INTERESTING BOOKLET.

The Waco Aircraft Co., of Troy, Ohio, has published a booklet entitled "One-Two," which is the story of the 1929 National Air Tour of 5,000 miles round the eastern United States written by Mr. John H. Livingston, who won the Edsel Ford Reliability Trophy with a Waco biplane. The second machine home was also a Waco biplane, hence the title "One-Two." Copies of the booklet may be had on application to the Waco Company.

AN OPPORTUNITY IN CANADA.

British manufacturers of aviation instruments and/or equipment who desire representation in Canada are advised to get into touch with Instruments, Ltd., of 240, Sparks Street, Ottawa, of whom the Managing Director is Mr. A. J. Ames. This company, which also has branches in Toronto and Montreal, already represents the Williamson Manufacturing Co. Ltd., the makers of the "Eagle" aircraft cameras and equipment. The Williamson Company recommends Instruments, Ltd., as a go-ahead concern.

SIR ALAN COBHAM'S NEW BOOK.

[*Twenty-Thousand Miles in a Flying-Boat.* By Sir Alan Cobham. The Story of his Flight Round Africa. 250 pages, 46 illustrations and a map of the route. Harrap and Co. Ltd. Supplied by The Aeroplane Book Department, Cannon House, Pilgrim Street, E.C.4. (on and after Feb. 14). 11s. post free.]

A review of Sir Alan Cobham's book, which from its subject alone should be of exceptional interest, will appear in The Aeroplane in the course of the next week or two.

"ACHIEVEMENTS OF 1929."

A booklet, under the above title, has been published by C. C. Wakefield and Co., Ltd., the manufacturers of "Castrol," and copies will be gladly sent to all interested inquirers.

The booklet comprises 64 pages and gives details of the triumphs on land, sea and in the air during 1929 in chronological order. These include records of 231 m.p.h. on land, 92 m.p.h. on water, the World's Height Record of nearly 8 miles and the flights of the largest aeroplane, the Dornier Do.X, and of the largest airship in the World.

As "Castrol" is almost universally used in all sporting events and record attempts in the aviation, motor, motorcycling and motor-boat world, "Achievements of 1929" forms a handy book of reference and at the same time a remarkable exposition of the popularity and success of "Castrol."

SHELL ENTERPRISE.

On Feb. 6 an informal ceremony was held at Croydon aerodrome when the Shell Company took delivery of three light aeroplanes which the company are sending abroad for the use of their representatives. At the same time a private lunch was given at the Aerodrome Hotel to wish the pilots of the three machines, Mr. Barrington Mason, who is going to Egypt; Mr. Rimmer, who is going to India; and Mr. Drew, who is going to South Africa, good luck in their venture.

Advantage was also taken of the occasion to open a Shell Service Depot on the Croydon Aerodrome. The first machines to be filled at the depot were the two Gipsy-Moths and the Genet-Avian, which are going to India, South Africa and Egypt respectively.

Sir Sefton Brancker, in wishing the pilots good luck, said that when any new venture in civil aviation was started he was always asked for financial support. On this occasion, however, all the Shell Company asked of him was his blessing, which he heartily gave. He congratulated the company on their enterprise, which resulted in showing the flag abroad in such a practical way. The Air Ministry were anxious to give every assistance to such ventures. He also hoped to learn from the Shell Company a lot about aerodromes, air routes, etc., that would be of use in their work of laying out the Empire's air connections.

SHELL ENTERPRISE.—A group taken on the occasion of the taking over of three light aeroplanes which the Shell Company are sending abroad for the use of their representatives. From left to right: Mr. Barrington Mason (Egypt), Mr. Rimmer (India), Air Vice-Marshal Sir Sefton Brancker, Mr. E. L. Drew (South Africa), Mr. Harold Owen and Capt. E. J. Jones (Australia), and Mr. R. R. Bentley of the Aviation Department in London. —(*"Aeroplane" photograph.*)

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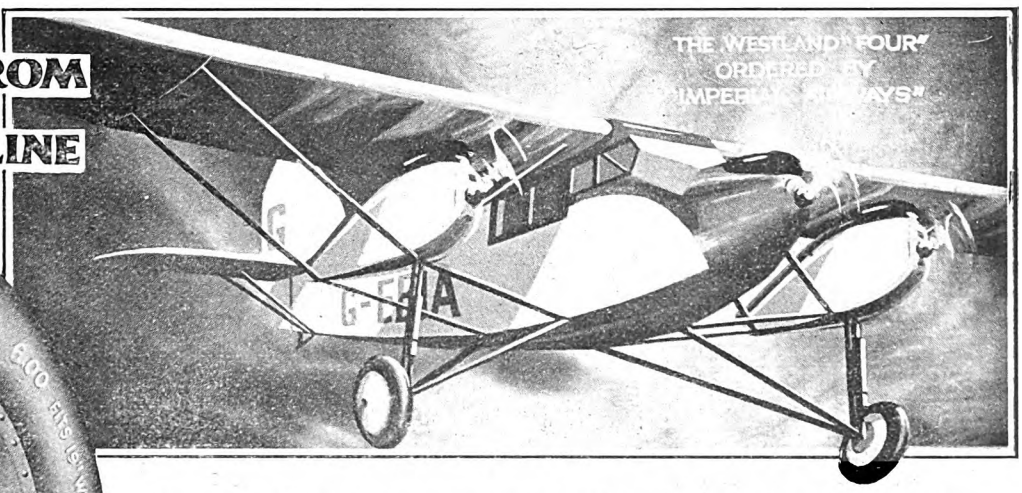

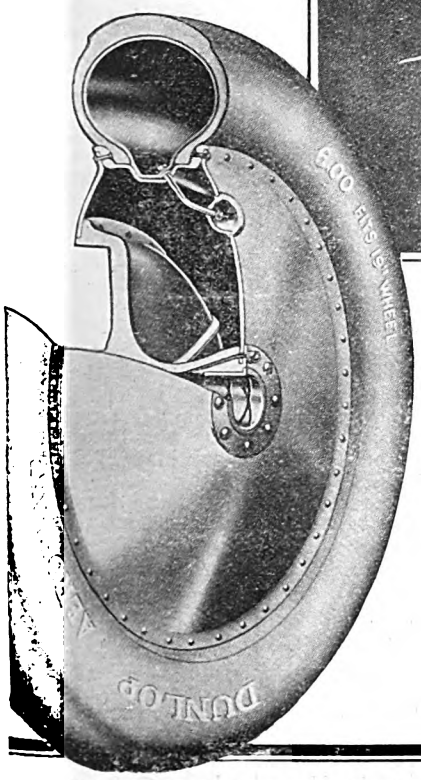

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SHELL ENTERPRISE.—The new Service Station at Croydon aerodrome with the two Gipsy-Moths and the Avian which the Shell Company are sending to India, South Africa, and Egypt respectively.

—(*"Aeroplane" photograph.*)

THE NAPIER RACING ENGINE.

Particulars have now been released by the Air Ministry of the Napier VII.D racing engine with which Flt. Lt. G. H. Stainforth, R.A.F., set up a World's Speed Record of over 336 m.p.h. in the Gloster VI seaplane.

The engine, which is a development of the standard 450 h.p. Napier Lion, develops 1,275 h.p. at 3,600 r.p.m., and weighs 1,130 lbs., which represents the abnormally low weight per h.p. of .889 lbs.

The overall dimensions of the engine are: Length over-all to centre of airscrew: 64 13/16 ins.; Width overall: 37 3/8 ins.; Height overall: 34 1/8 ins.

Apart from the extra power and the lower weight per h.p. obtained with this engine, the overall dimensions are smaller than those of the 1927 engine which won the Schneider Trophy in that year. Of this engine, Mr. H. R. Ricardo, the well-known engineer, said—"The highest thermal efficiency ever yet recorded by any heat engine—namely 39.5% on the net shaft horse-power—was obtained on the Napier racing engine which won the Schneider Trophy in 1927."

K.L.G. AGAIN.

To report that Mr. Chichester, who recently flew from England to Australia in a Gipsy-Moth, used K.L.G. Plugs seems almost unnecessary.

Smith's Aircraft Instruments, a branch of S. Smith and Sons (M.A.), Ltd., of 185, Great Portland Street, W.1, has received the following cable from Mr. Chichester:—"K.L.G. Plugs and 'Husun' Compass as usual functioned perfectly throughout flight—Chichester."

A NEW OIL CLEANER AND COOLER.

Smith's Aircraft Instruments have added a very interesting and efficient oil cleaner and cooler to their wide range of accessories.

This device, called the "Carter" Oil Cleaner and Cooler, consists of a high-speed rotor, of 3¼in. diameter, enclosed in an aluminium case, above which is a dome-shaped sheet brass cooling element, measuring 9½in. across. A brass flange, adapted for rivetting, or sweating, to the oil tank, is supplied to the unit, the total weight of which is 7lb. 5oz.

The cleaning unit is fitted on top of the oil tank, and is coupled to the return oil pipe from the engine. Aerated oil passes into the rotor under pressure of about 40lb. per sq. in., and sprays through jets upon the inner surface of the cooling element, the outer surface of which is exposed in the slip stream of the aeroplane. The rotor is made to spin by the re-action of oil and air, which issues through nozzles.

Impurities in the oil are separated by centrifugal force, and accumulate in annular trays within the rotor. The cooled oil drains down into the tank through the air space above the oil in the tank. A relief valve is provided to limit the maximum pressure when the oil is cold.

The cooling element, rotor cage, and rotor can be removed by unlocking and unscrewing a ring nut, and the rotor trays can also be removed with ease for cleaning. The rotor should be cleaned after ten hours' flying.

Where the oil tank is below the top cowling, the cooling element may be made to replace part of the cowling, thus effecting the necessary cooling without increasing drag.

The apparatus is suitable for oil flows ranging from 50 to 150 gallons per hour, and is particularly suitable for the Bristol Jupiter engine.—M. S.

HACKSAWS.

More than ten years have elapsed since British Hacksaw Makers introduced a standard price-list for Hacksaw Blades. During this period certain anomalies and inaccuracies in the list prices have become apparent.

To correct and simplify these the British and American Hacksaw Manufacturers' Associations have agreed on a new price-list. The German Hacksaw Makers' Association with whom the British Makers have been in negotiation are expected also to adopt the British-American List.

The new list, which includes only 61 sizes as against 139 in the old list, contains full particulars of these sizes and their new prices, and may be obtained from the British Hacksaw Makers' Association, Morris Deakin Building, King Street, Sheffield.

INVAR.

The alloy known as Invar, which is a 36 per cent. nickel iron, made by Henry Wiggin & Co., Ltd., of Birmingham, has a lower co-efficient of expansion than any other metal or alloy in common use, and is used where adjustment for expansion is required (e.g., in the construction of pendulums, chronometer balance-wheels, and for measuring-tapes).

Advantage is taken of this property of Invar to reduce and adjust the expansion of other metals. If aluminium components, for example, be assembled with steel bolts, the respective co-efficients of expansion being approximately 0.000,025 and 0.000,012, variation in temperature may cause distortion or even fracture. If, however, a packing washer of Invar (co-efficient of expansion 0.000,002) be inserted, of such a thickness as to make the total expansion of the aluminium plus the Invar equal to that of the steel bolt, distortion is avoided.

The application of this practice to internal combustion engines has led to a distinct improvement in the design of aluminium alloy pistons for high efficiency engines. A piston of the split-skirt type is fitted with an internal strut or cross-piece of Invar in such a way as to maintain a nearly constant diameter, while the expansion of the aluminium is taken up by the "split."

The alloy possesses good mechanical properties. It is not only strong, but remarkably ductile, and the following figures, which represent the average of ten tests taken at random, on standard hot-rolled rods as received from the Company's works, may prove of interests:—

Yield point, 24 tons per sq. in.; breaking stress, 39 tons per sq. in.; elongation, 43 per cent.; reduction of area, 66 per cent.; Brinell No., 140-142; Izod impact (A.I.D. standard specimen), 120 ft.-lbs.; 1st notch, 88 ft.-lbs., bar not fractured; 2nd notch, 96 ft.-lbs., bar not fractured.

The preceding tests were made for Air Ministry inspection.

FRENCH ACTIVITIES IN THE BALKANS.

The Rumanian Government has placed an order with the *Société d'Aviation Roumaine*, a company formed in Bucharest by the French Blériot Company with the support of the Rumanian Government, for 100 aircraft of a total value of 110 million lei.

The Bulgarian Government is reported to be negotiating with this company prior to placing an important order for aircraft.

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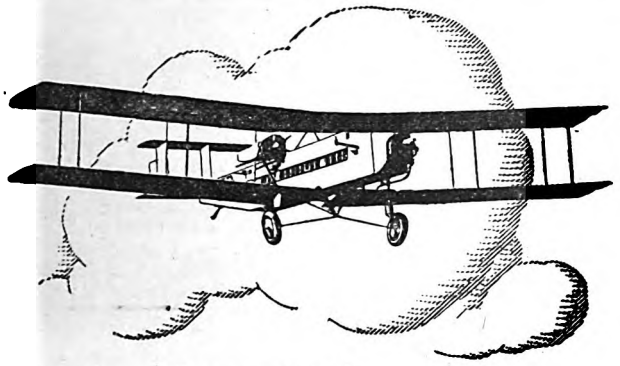

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Telegrams: "Impairlim, London."

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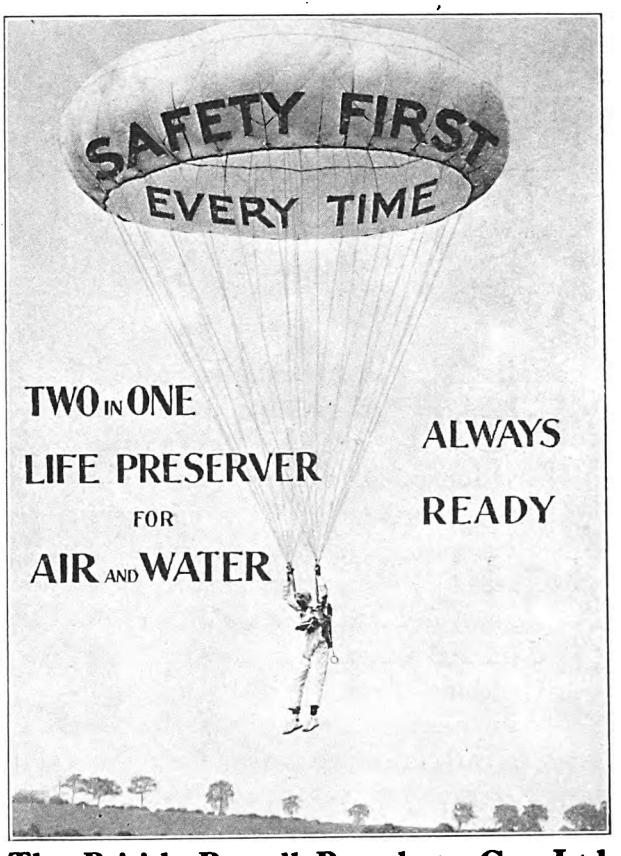
Bentley's Code, A.B.C. 5th and 6th Edition.



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LUBRICATION.

As has already been reported in The Aeroplane, W. B. Dick & Co., Ltd., the manufacturers of "Ilo" lubricating oils, have bought a Gipsy-Moth which will be used to demonstrate in the most practical way possible the efficiency of mineral oils for aero-engines.

Mr. E. C. Brown, the company's Aviation Representative, will fly the machine, and he is going to fly it on a 100 hours type test after which the engine will be returned to the manufacturers for their inspection. The oil to be used will be drawn from one of their stock tanks which will be of a standard quality which the company can guarantee.

W. B. Dick & Co. Ltd. was established in 1853, and since that date has played an important part in the development of the great oil industry. The crude oils from which the "Ilo" lubricants are refined are drawn from the oilfields within the Empire, from Mexico and the United States, from some of the European oilfields, and from many of the other oil-producing centres. The company's refineries are at Rotherhithe and here the crude oil is converted into the many different grades and kinds of "Ilo" lubricating oils. These include Turbine oils, Marine Engine and Cylinder oils, Diesel engine oil, Transformer oil, Soluble and Compounded Lard oils, Motor oil, &c.

"Ilo" oil, for whatever industrial use it is required, always represents the very latest and best in lubricating practice. It has been tried under the most exacting conditions.

During the last five years the company has spent a considerable amount of money in their research laboratories in connection with their aero-engine lubricating oils and the practical demonstration of its use in their own machine is in the nature of a routine test and is in accordance with the company's policy, that is to submit their products to every test to prove its reliability. A copy of the De Havilland company's independent report on the behaviour of the Gipsy engine with "Ilo" oil will be issued by the company after the 100 hours test.

As regards the supply of "Ilo" aero-engine oil, W. B. Dick & Co. Ltd. have works in London, Liverpool, and Glasgow, and they also have agents and storage depots in every part of the World. A booklet entitled "Scientific Lubrication" is now in course of preparation, and the company will be pleased to send a copy when it is ready to anyone interested in aero-engine lubrication. The Aircraft Department of W. B. Dick & Co. Ltd., 26, Grosvenor Gardens, London, S.W.1, will be glad to give lubricating advice to all aircraft users.

NEW COMPANIES.

Kent Aircraft Services Ltd.—Private company. Registered Feb. 6. Capital, £2,100 in 2,000 10% ordinary cumulative preference participating shares of £1 each and 2,000 deferred shares of 1s. each. Objects: To carry on business as instructors in aviation, aerial navigation and aerial and ground signalling, importers and exporters of aircraft, and aircraft engines and transporters of goods and passengers by air; also air-taxi work, flying exhibitions, etc. The directors are: K. G. McDouall, 21, Trinity Gardens, Folkestone (chairman). Mrs. E. C. L. McDouall, 21, Trinity Gardens, Folkestone. F. H. McDouall, 21, Trinity Gardens, Folkestone, motor engineer. Lt.-Col. A. Jobling, V.D., Gorse Bank, Richmond Road, Bexhill-on-Sea. Major F. V. Jobling, Gorse Bank, Richmond Road, Bexhill-on-Sea. Flt. Lt. A. D. Stonehouse, R.A.F. (retd.), Radnor Chambers, Folkestone. Secretary: A. D. Stonehouse. Solicitor: R. C. Z. D. Brockman, 12, Cheriton Place, Folkestone. Registered office: Radnor Chambers, Folkestone.

PERSONAL NOTICES.

Death.

BEAMISH.—On Feb. 5, at his residence, The Cliff, Larne, Co. Antrim, Frank George Beamish, H.M. Inspector of Schools. (Mr. Beamish was the father of Flt. Lt. F. V. Beamish, Flt. Lt. G. R. Beamish and Flg. Off. C. E. St. J. Beamish.)

Forthcoming Marriages.

ATKINS—MOORE.—A marriage has been arranged, and will shortly take place, in France, between Major B. S. Atkins, 7th Rajput Regiment, late Commandant, The Mina Corps, younger son of the late Sydney G. Atkins, of Coston Hall, Norfolk, and Mrs. Atkins, of 50, Kirkley Cliff, Lowestoft, and Isabelle, only child of the late Frank Moore and Mrs. Moore, of Belmont, Marlborough Park, Belfast.

RAIKES—MULLALY.—The engagement is announced between Wing Cdr. H. R. Raikes, A.F.C., late R.A.F., Principal of the University of the Witwatersrand, Johannesburg, third son of the late Canon W. A. Raikes, of Goudhurst, Kent, and Mrs. Raikes, and Joan, only daughter of the late Charles Mylne Mullaly, I.C.S., and Mrs. Mullaly, of Oxford.

STANILAND—GREGORIE.—The marriage between Flt. Lt. Staniland, late R.A.F., second son of Mrs. Staniland, Abbey House, Louth, and Evelyn Mary, daughter of Mr. and Mrs. F. Gregorie, Stones Place, Lincoln, will take place on Mar. 4, at St. Peter's-in-Eastgate, Lincoln.

Marriage.

BARKER—GRANT.—On Feb. 1, at Chiswick, Edward Robert Barker, D.S.C., late R.A.F., son of the late Samuel Barker, of Springhill, Hoylake, and of Mrs. Barker, of 14, Zetland House, Marloes Road, W.8, to Dorothy Grant, widow of Gerald Wallace Grant, M.C., M.B., Ch.B., of Halifax, Nova Scotia.

Births.

CAPENER.—On Feb. 7, at Hampstead, to Kathleen, wife of Flt. Lt. H. W. Capener, R.A.F.—a son.

DYOTT.—On Jan. 22, at Merrick, Long Island, N.Y., U.S.A., to Persis (*née* Wright), wife of G. M. Dyott—a son.

VALK.—On Feb. 1, at Bandoeng, Java, to Gladys (*née* Davison), wife of Flt. Lt. Paul Valk, Netherlands East Indian Army—a daughter.

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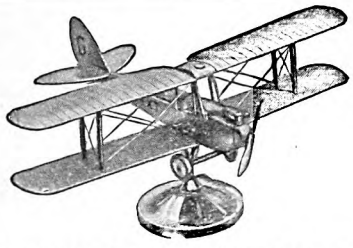

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All advertisements for this column should arrive at this office by first post Monday, to ensure insertion.

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AIRCRAFT INSTRUMENTS.

Aeroplane Wheels, New. Fitted with Dominion 26 x 2½ heavy tread tyres, and new tubes. Pair, complete with axle and bushes, 70s. carriage forward; Windscreen Frames and Brackets, without glass 2s.; K.L.G. Plugs, F.9 new, 9s. 9d. doz. Revolution Indicators, Smith's, 600-2,600 r.p.m. with 3 ft. drive, 22s. 6d.; Above postage paid. Send for free list. Coley Ltd., Ordnance Works, Queen Elizabeth Road, Kingston-on-Thames. 'Phone 0365.

AIR TAXIS.

Air Taxis Ltd., Stag Lane Aerodrome, Edgware. 'Phone: Edgware 0849.

Aerofilms Limited, Aerial Tours, Taxi Work, Aerial Photography. Air Survey. Colindale Avenue, Hendon, N.W.9. 'Phone: Colindale 6183 and 6184.

National Flying Services Ltd. (Tel. Ger. 9316.) Go by N.F.S. 1s. a mile; 1s. 6d. two passengers.

AIRCRAFT FOR SALE.

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Joy-Riding.—Le Rhone 504K Avro. Splendid condition. New March, 1929. Complete joy-riding outfit with good stock of machine and engine spares. Spare engine. Field screens—Light Van. £220 or nearest. Bint, 181, Yardley Road, Acocks Green, Birmingham.

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Edited by C.G.Grey

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FEB. 19, 1930.

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Incorporating

Aeronautical Engineering

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AIRCRAFT AS THEY MIGHT BE.—I.

(A Would-Be Humorous Paper Read Before the Leeds and Brough Branch of The Royal Aeronautical Society.)

Although this paper is entitled "Aircraft as They Might Be," I do not want anybody to think that it is going to attempt to tell our experienced aeronautical engineers how to conduct their own business. Its intention is simply to offer a few lines of thought to all those who either design, construct or use aircraft. The whole thing arose, in fact, out of an argument in the offices of THE AEROPLANE between several people who have had a good deal to do with aeroplanes in one way or another. And most of the argument was carried on purely as a joke.

Those of you who are readers of Kipling may remember that when the engines of the good ship *Haliotis* were wrecked by a shell from a Dutch gunboat and the crew were imprisoned in a Far Eastern harbour on their own ship for pearl-poaching, they set to work and repaired the engines themselves with such material as they had at hand. When the job was done, the Chief Engineer, Mr. Wardrop, clad, if you remember, in a long white beard and a loin-cloth, remarked "She turns over and she does not hit anything, but you will understand this is in no sense regular engineering."

In the same way this paper is in no sense regular engineering. At the same time there is many a true word spoken in jest, and so some of the apparently crazy ideas set forth hereafter may conceivably set going some really intelligent and workable notion among other people.

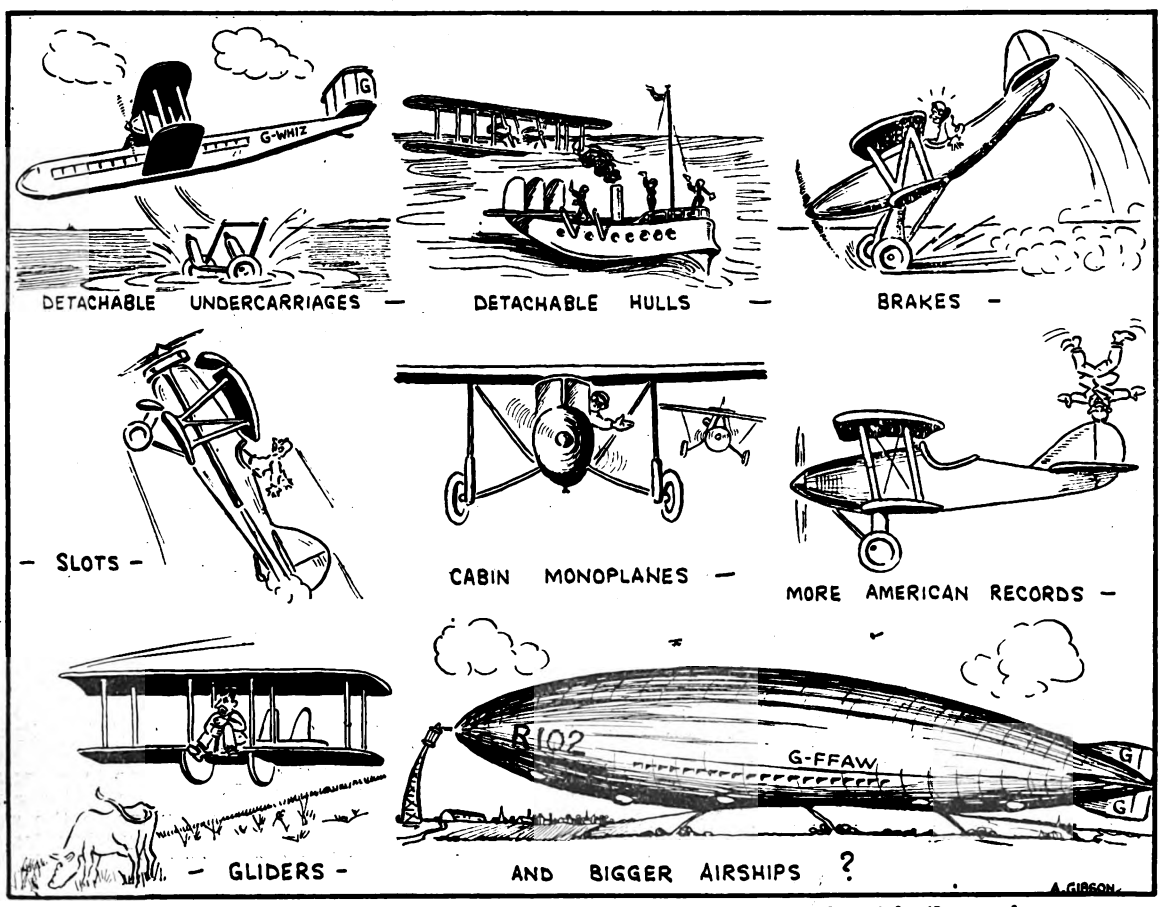
Some little while before Christmas the staff of THE AEROPLANE decided that we ought to have a New Year's Card to send out to various and sundry friends. So, naturally, we turned to our Mr. Leonard Bridgman for a picture. Some members of the staff suggested one thing and some suggested another, and eventually we decided on the idea shown in the accompanying picture.

Then naturally the question arose of what aeroplane was to be shown in the picture. If Mr. Bridgman drew any existing aeroplane then that machine would be getting a free advertisement which would be unfair to other people in the Aircraft Industry,—more especially as the cards would be sent abroad in hundreds. Consequently we decided for a joke to design a machine of our own. And while we were at it various visitors drifted into the office and made more or less foolish suggestions, some of which were embodied in the design.

Seeing that in these peaceful days Civil Aircraft are of more general interest than are War machines, we decided to have a civil air transport machine of a type which would not be too revolutionary. And so we made what we ultimately agreed might be a workable machine, though quite unlike anything anybody has built so far.

Some of our visitors wanted a high-wing monoplane, so that they could see downwards. Some wanted a low-wing monoplane, so that they could see upwards and all round

"BE NOT THE FIRST BY WHOM THE NEW IS TRIED
"NOR YET THE LAST TO SET THE OLD ASIDE." - *(Old Proverb.)*



SUGGESTIONS FOR 1930.—Some ideas of how development may work out in the coming year.

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and in a forward direction, so as to be quite clear of any danger of collision. That is a point which seems to be exercising the minds of practical pilots to-day more than almost anything else.

Everything in life is a compromise, so we decided to make the machine a middle-wing monoplane. Some of the critics wanted to know how we proposed to take the spars through the middle of the cabin. In a high-wing machine your spars go over the top, and in a low-wing machine they go under the floor, and the cabin is open for internal circulation. But after all, if you take your spars inside the cabin, you are really no worse off than you are in a saloon car where the back of the front seat cuts the saloon in two.

The only things on which I personally insisted were that there must be a seat beside the pilot for either a spare pilot or for somebody who knew something about flying, and that the engines must drive pusher screws.

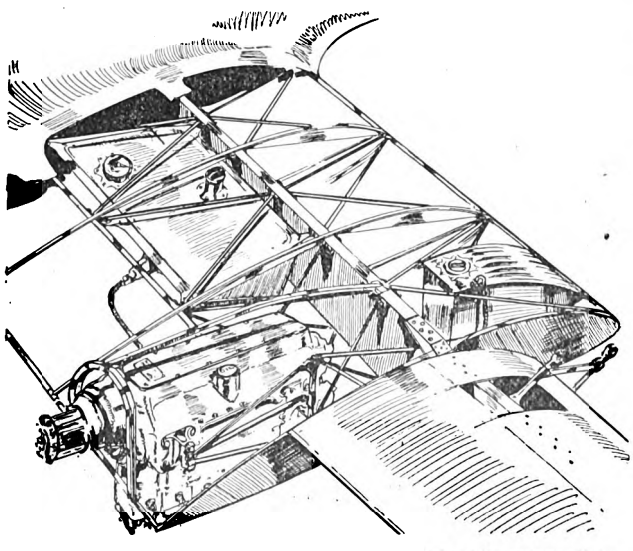
These happen to be particular fads of my own. One thing of which I have a perfect horror when flying is being shut up in a cabin at the mercy of one pilot, who may faint or may be hit by something flying off the machine and be put out of action without any possibility of anybody else taking charge. In the ordinary type of cabin machine where three or four people are all in the same compartment with the controls, or in a machine in which there is room for a person alongside the pilot, even if the person nearest the control is not a fully qualified transport pilot, there is always a chance that if the pilot is knocked out for any reason someone else can take charge and make something like a sporting effort at getting the machine down more or less safely.

Apart from that, there is the point that for long-distance voyages, especially where a party of people in a privately-owned machine are going for a long journey, there is every reason for providing for a change of pilot while in the air. That, for example, is why Mr. Charles Barnard chose a cabin monoplane for the journey with the Duchess of Bedford and Mr. Little to India and back.

Probably in the near future when well-to-do people buy aerial limousines for private use, though they will not want to pilot the machine themselves, they will like to take over the controls for part of the journey. That in itself is a good enough reason for providing for a change of pilot in the air.

Then we come to the question of pusher airscrews. There has been, as you know, a good deal of argument about the relative merits of screws which push and screws which pull. Practically all aeroplanes of to-day, except a few experimental machines, and some Continental machines with engines in tandem, with one pusher screw and one tractor screw, are at present tractors.

MORE OR LESS CONVENTIONAL.—A Greeting to all for the New Year, with a slightly out-of-the ordinary aeroplane.



ONE WAY OF DOING IT.—Mr. Bradshaw's suggestion for fitting an inverted in-line engine, driving a pusher-screw, in a monospar wing.

Most aerodynamic experts agree that pusher screws are more efficient. But tractor screws are more popular because up to the present we have used our airscrews fixed direct to the engine-shaft. Of late we have developed gearing for the engines, and so we have got away to a certain extent from the direct drive. From geared airscrews, in which the gear-box is built into the engine, to geared screws driven by a shaft some distance away from the engine seems to be a logical line of development.

The real difficulty about these pusher screws is simply that to get the balance of the machine right you must have your heavy weight, in the shape of the engine, in the front of the wings. And with modern wings with a very deep chord there is considerable difficulty in producing detail designs which will carry a gear-box near the trailing edge of the wing, in which the gears have to be driven by a shaft extending practically from the front to the back of the wings.

In the course of our argument about this, some of the would-be experts involved therein suggested that by using a wing of much narrower chord than is usual, and by using an engine with the cylinders in line planted on top of the wing, with a fairly long projection from the crankcase rearwards, pusher screws could be got into the proper place behind the wings. They also suggested that by carrying the cabin well forward, with the weight of the pilot and his companion stuck out well in the front, the weight could be got in the right place.

Wing-Loading.

Some of these experts side-tracked the argument onto the question of the span and chord of wings. They dared to suggest that our present method of judging a machine by the loading per square foot of surface of wing is altogether wrong. They argued that most wings in use to-day are miserably inefficient because their aspect-ratio is too low.

Against this one well-known expert argued that wind-tunnel tests had shown that there is no advantage in having an aspect-ratio of more than 6-to-1 or 7-to-1, and that 10-to-1 was no better and might be worse. Perhaps the chord is rather a function of the thickness of the wing than of the span.

The advocates of high aspect-ratio produced evidence by quoting the amazing performances of German gliders, which have an enormous span and a very small chord. Also they argued that these German gliders, which are mostly unbraced cantilever monoplanes, have in fact mono-spar wings.

They have as a rule one single spar which is placed rather further back than is the front spar of most of our two-spar wings and the whole of the leading edge forward of that spar is practically a box covered with plywood. Thus the curved plywood and the main spar form one large box-spar. Aft of the main spar is fabric carried on light ribs, and the trailing edge of the wing is very flexible.

While this section of the argument was in progress, another expert came in and began to argue that one reason why the gliding angle of every aeroplane in the world is so poor is that they all use rigid trailing edges instead of making them flexible like the wings of a bird. He pointed out that only the very best aeroplanes have a gliding angle

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as good as one-in-ten, whereas any self-respecting bird which professes to be a gliding bird and not merely a flapping bird, has a gliding angle anywhere between 1 in 50, or 1 in 100. And, he argued, there is no reason why properly designed aeroplanes should not glide just as well as any bird.

One argument produced in support of this theory was the albatross, which is acknowledged to be one of the finest gliding birds in the world, seeing that it can start gliding on the very slight up-current caused by the wind blowing over the waves.

The albatross' wings have an enormous aspect-ratio and because of this huge span the albatross cannot get off a calm sea with any approach to comfort. Therefore, he argued, unless the albatross wants his high aspect-ratio for gliding he is simply a fool to have it, because a low aspect-ratio with a big chord would help him to get off the water very much more easily than he does. Therefore, on the whole, we may agree that we should get better results out of our wings all round if we had a higher aspect-ratio.

Pusher Screws.

Given higher aspect-ratio and a smaller chord, the problem of getting pusher screws into an aeroplane of more or less normal twin-screw type is certainly made a little easier. So let us revert to this question of pusher airscrews.

A chief reason for this insistence on pusher screws is that if air transport is ever to become popular it must be comfortable, and one of the worst discomforts of flying at present is the noise.

Of all the sciences of which man is ignorant in varying degress the science of acoustics is probably at the head of the list. Whether the architects who built cathedrals seven or eight hundred years ago, or those who built temples a thousand, or two thousand or three thousand years ago, knew more about the science of acoustics than we do, or whether they merely learned in the hard school of experience does not matter much. The fact remains that today we know precious little on the subject.

The Albert Hall was built, I think, somewhere about 1850, and the acoustics of that building are undoubtedly the worst in the World. And for eighty years or so all the cleverest scientists in this particular line have been trying to discover some means of stopping the echo off the roof of that hall, and none of them has done it.

Modern cathedrals and modern halls are probably better because the architects have learned something from experience. But of actual knowledge on the subject there seems to be hardly any.

Now acoustics have a great deal to do with noise in aeroplanes. One of the most peculiar examples I have come across is the twin-engined Fokker with two Jupiter engines. When you are flying in the cabin of that machine the noise is very little worse than the noise in any ordinary London tube train. But during the Rotterdam Meeting I spent a whole afternoon sitting watching the show while one of those same Fokkers was joy-riding on the aerodrome.

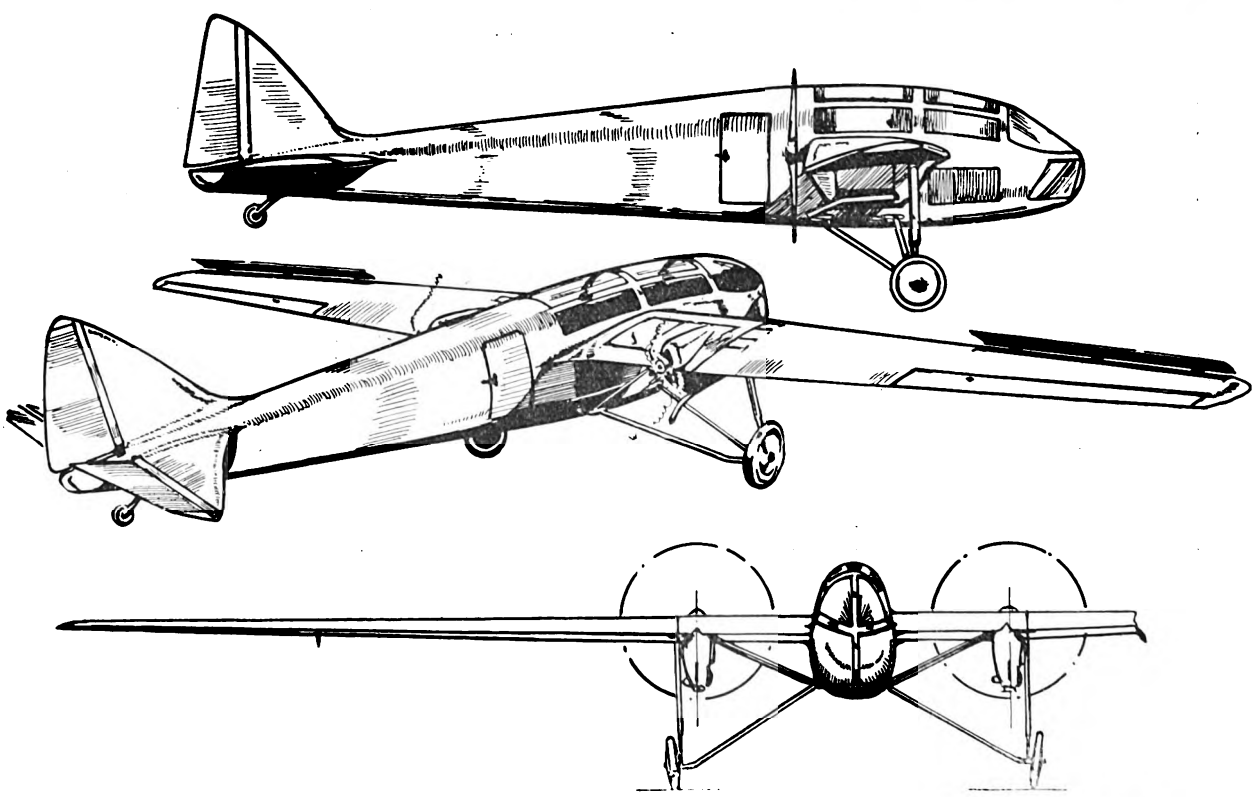
Every time it took off and passed us at a certain angle, it made a shattering noise which I have never heard equalled except by a flight of Fairey Foxes diving. There seemed to be some reflected effect from the under side of the wing. At any rate the noise made by those engines was ten times as bad when you were on the ground half a mile from it, as it was when you were sitting in the machine within two or three feet of those same engines. One expert explained this by saying that the noise is caused by the whip of the tips of the airscrews. Perhaps it is. But the fact remains that it is worse outside than inside the machine.

In our own machines, which are twin-engined or three-engined biplanes, with ordinary square box fuselages and fabric sides, the exhaust noises of the engines are not particularly annoying. What really deafens one is not so much the noise itself as the throbbing of the sides of the fuselage, and I am perfectly convinced, by careful observation, that this vibration is caused simply by the blades of the airscrews throwing the slipstream back rhythmically against the leading edges of the planes and against the struts and engine-housings and so forth.

This particular throbbing, which affects the head and ears so badly, synchronises exactly with the throbbing of the fabric of the trailing edge of the wing, which quite distinctly synchronises with the passing of the blades of the airscrew. Consequently, I am quite convinced personally that if you could put the airscrews at the back you would get away from that throbbing, and so you would get away from most of the inconvenience caused to the passengers. The actual exhaust-noises from the engines can be silenced quite easily.

Engine Possibilities.

Now, to come back to our comic Christmas Card aeroplane. When these cards had been sent out, a friend of mine on the Continent, one of the best known and most successful aircraft constructors, wrote back saying that he liked our aeroplane, but why did we go and spoil its efficiency by putting struts and engines on top of the wings, thus spoiling the most efficient part of the wing? He added that we should probably get back a great deal of that loss by using pusher screws as we did instead of tractors,—which



A MODERN POSSIBILITY.—A twin-engined pusher mono-spar cantilever monoplane, with inverted engines, slots, brakes, and tail-wheel.

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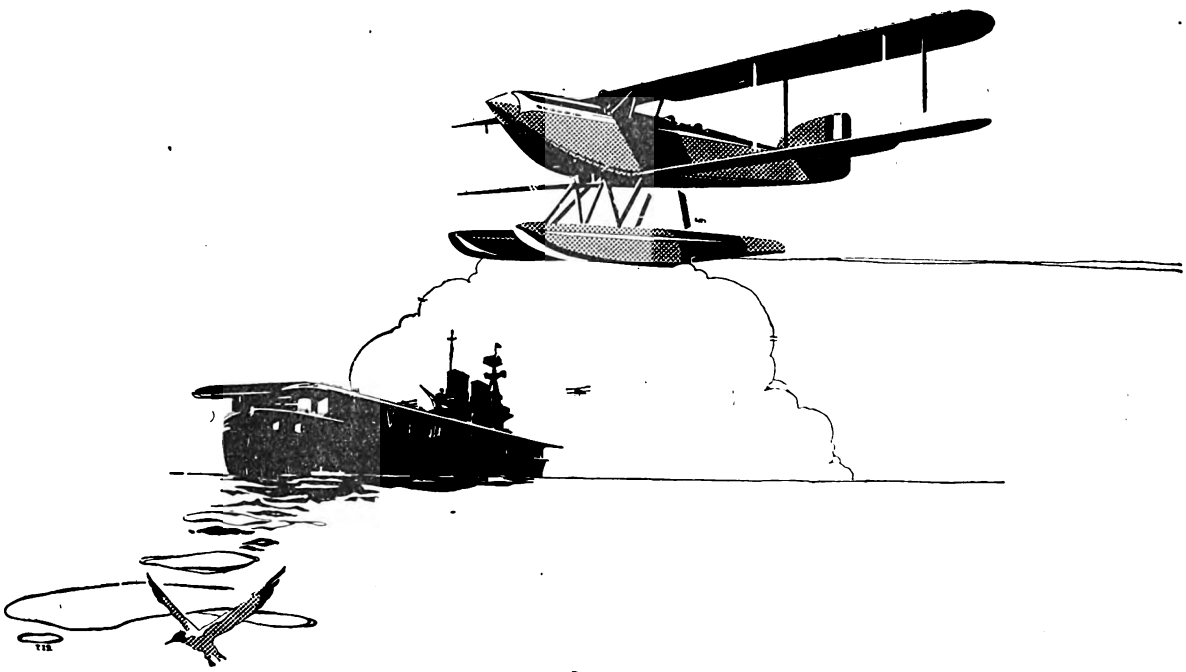

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was rather a compliment from a constructor who so far has always built tractors.

My answer was that we did not want to shock him too much by being too revolutionary all at once in our design. I told him that my idea of an engine for a job of this kind would probably be a 12-cylinder double-opposed horizontal engine built right into the wings, between the front and rear spars, with shaft and gear-box streamlined out at the back to carry the airscrew, but that in the meantime, pending the production of such an engine, we could probably get along quite well by using an inverted in-line engine sunk in slots in the wing.

That would leave the top of the wing practically clear, at any rate it would leave it with an unbroken leading edge and an unbroken upper surface as far as the front spar, which is the part that matters most, where the efficiency is concerned.

Aft of that the crankcase and gear-box of the engine might have to stick out over the rear spar. Then, of course, we should remove the struts from the top of the wing and strengthen the struts underneath.

Our New Type.

On the previous page you have a sketch by Mr. S. O. Bradshaw of a machine built more or less on those lines. Perhaps it would be an improvement on the other.

Besides tucking the engine into the wing, and only leaving the heads sticking out below, where they do far less harm, we have streamlined the whole body, so as to do away with the ugly slab sides of the original model.

Here is another point on which you will find flat contradiction between eminent aerodynamic scientists. One will tell you that a four-sided body is just as good a streamline as a proper fish-shaped body so long as the lines merge properly together towards the tail. Another will tell you that you cannot hope for even reasonable efficiency with slab sides. Anyhow, there is certainly something to be said for fairings off the fins and tailplanes into the body, and for fairing off the butts of the wings into the sides of the fuselage by putting gussets, or whatever you like to call them, into the angles.

Considering the thousands of pounds that have been spent on wind-tunnels and different forms of blowers for them, and big wind-tunnels and high-pressure wind-tunnels, the amount of disagreement on essential points of his kind is really very sad. If the word "science" means knowledge, then surely scientists, like birds in their little nest, ought to agree on essential points.

Therefore, as I do not wish for a moment to set up as knowing anything which scientists do not agree to be absolute knowledge, I will merely say that we have rounded the fuselage and faired the wings and tail and fins into it just because it looks pretty. If it gives the machine a better gliding angle, so much the better for us.

Lateral Control.

You will notice that our 1930 model has been fitted with slots. This is not done as an advertisement for Mr. Handley Page, nor is it done because The Aeroplane has been pushing slots down the throats of the aerodynamic public for something like ten years, and does not want to go back on what it has said. It is done because at this date slots seem to have proved their case. There may be something better, but if so it has not yet been disclosed. The convinced advocates of thick wings will tell you that they can produce a machine which without slots will do anything that a thin-winged machine will do with slots. On the other hand, the advocates of slots will tell you that if a machine with a thick wing has such and such a performance in the way of keeping under control below stalling point, or getting off or lifting a particularly heavy load, whatever that thick wing does can be improved by fitting it with slots.

We still have to see a Fokker monoplane fitted with slots all along the edge. Possibly someone will go to the trouble and expense of making such a fitment some time or another. The result of the experiment ought to be interesting.

Be that as it may, the fact remains that slots have proved themselves an excellent anti-spinning device when a machine is being brought down below stalling point.

Even if we only fit slots at the wing-tips, simply to make accidents unlikely and to keep the machine under control while it is stalled and sinking into an aerodrome to save a long glide, we have at any rate a useful safety device. And, anyhow, the only two machines which did any good in the Guggenheim Competition both had slots all along their wings.

What could be done by fitting them all along the leading edge of the wing has not been calculated for this particular type of aeroplane. But certainly it would improve the lift, always providing that the machine could be put on the ground or got off it with the wings at such an angle that slots would be usable.

Present Limitations.

The real trouble with slotted wings at present is that they never can be used to the best advantage. If you fit slots all along the wings of a passenger-carrying aeroplane and then bring the machine into an aerodrome with the wings at such an angle that the slots are working to the best advantage, you will be bringing the passengers down with their feet rather higher than their heads. And that is not going to make aviation any more popular than is carrying passengers about in a machine so noisy that it is battering their brains out the whole time they are flying.

Also, you cannot take a machine off the ground with the slots operating properly. The best you can do is to run the machine along the ground with the tail up and slots closed, jerk it off the ground, then put the tail down to the point at which the slots open, and proceed to climb. That sort of operation is not going to please the passengers either.

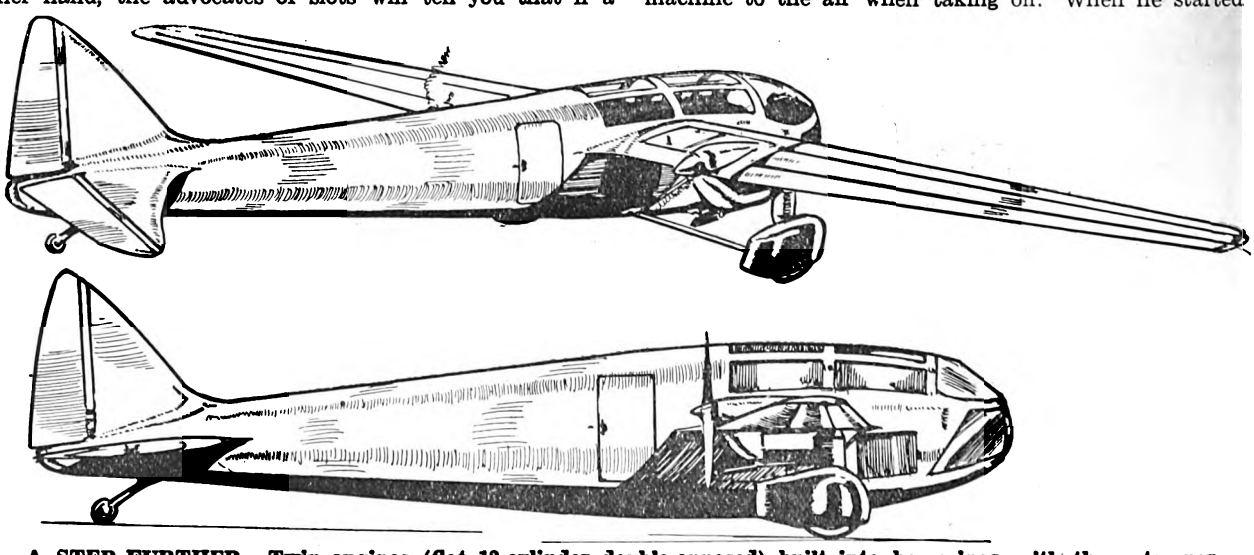
Consequently, most of the machines which are fitted with slots are taken off the ground and go on climbing with the slots closed. The result is that slots are only doing a very small fraction of what might be done with them if we could find some way to use them to the best advantage.

An Old Device.

Somewhere about this point in the argument one of the old hands on aviation broke in with a reminiscence of a quaint biplane built near Paris by one Paul Schmitt a year or so before the War 1914-18.

At first sight this machine was an ordinary rather large tractor biplane. When you looked at it closely you saw that the wings, instead of being built direct into the fuselage, were braced to one another by steel tube cross-members in the shape of an X on each side of the fuselage, and the middle of this steel X was attached to a great steel tube like a young barrel, which was carried across the fuselage on bearings like trunnions. This tubular arrangement had a worm gear round it which was wound by a handle in the fuselage.

When Mr. Schmitt wanted to start he used to wind his wings back so that they were at an angle to the machine about equivalent to the angle of the wings of an ordinary machine to the air when taking off. When he started up



A STEP FURTHER.—Twin engines (flat 12-cylinder double-opposed) built into box wings, with the outer portions of the wings rotatable round a single spar to give a variable angle so that slots may be used to full advantage. Wheels covered by streamline spats.

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CIRRUS & HERMES ENGINES PRAISED

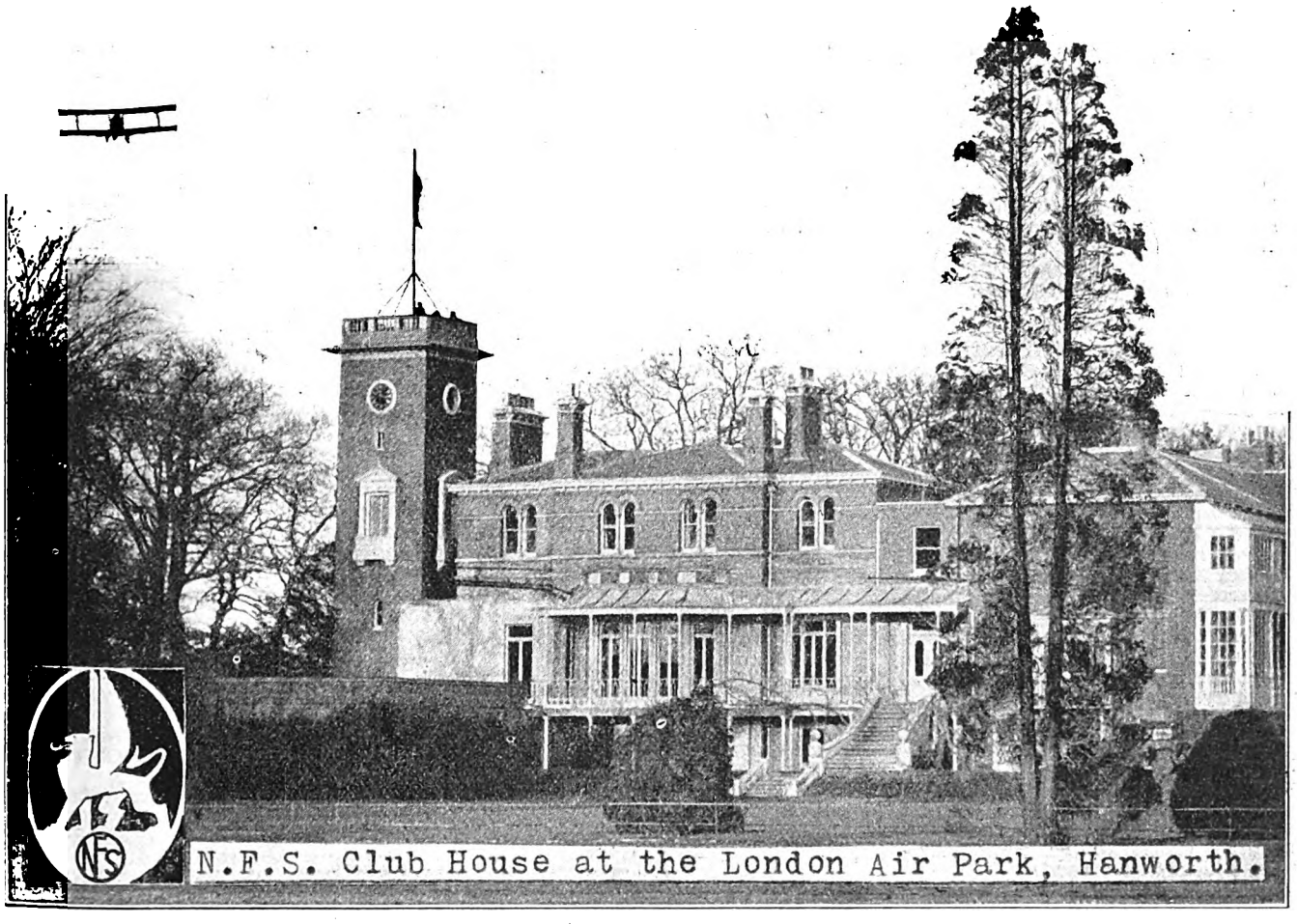
BY

NATIONAL FLYING SERVICES.

Extract from a letter dated 8th February, 1930, from Mr. G. E. F. Boyes, Deputy Managing Director, NATIONAL FLYING SERVICES LTD.

"I should like to repeat on my behalf, and on behalf of the Chief Engineer of this Company that we are very satisfied with the performance of the CIRRUS and the HERMES engines.

We are preparing a report shortly of hours flown, replacements, etc., which I am sure will be of interest to you, and a copy of which I will send to you." . . . . .



N.F.S. Club House at the London Air Park, Hanworth.

CIRRUS AERO ENGINES, Ltd.,

— Regent House, —

89, KINGSWAY, LONDON, W.C.2.

Telephone: HOLBORN 4076.

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the engine the machine ran along the ground with the fuselage level and took off more or less in that position. When once she was in the air Mr. Schmitt proceeded to wind his wings back to a normal position, and the machine looked very much like any other tractor biplane of the period.

That machine used to get off the ground with quite an astonishing load for that time. Early in the War 1914-18 it was used for bombing. And reports from Paris at that time said that it could carry bigger bomb-loads than anything else in the French Army.

Unfortunately, it was shot down, or brought down by engine failure, comparatively early in the war, and nothing more was heard of it. Since then nobody has thought the development of the idea worth while. But there is just a possibility that there might be something in it at the present day.

A Possibility.

Suppose you build quite an ordinary monoplane of present type, either a high wing or low wing, and, instead of building the wings fixed to the fuselage, you build them on a large steel tube, or even some sort of sector arrangement, which will allow you to vary the angle of the wings without varying the angle of the fuselage.

Then you can fit slots the whole way along the leading edge, and get your machine going across the aerodrome with the slots wide open and doing their best work.

Similarly, when you come in to land, instead of having to drop your tail, and slide all your passengers into the backs of their seats, while the machine appears to rear up in front in an alarming manner, you can merely wind your wings back and again get the full benefit of your slots in landing.

The performance might look a bit queer at first, but I fancy that people would soon get used to it.

Also, there might be a certain amount of trouble with the tailplane, for one never knows what curious current may be set up by playing about with wing-angles in this way.

Anyway, one thing seems most probable, namely, that by keeping the fuselage, and consequently the tail and elevators, in a normal flying position, with the wings practically at stalling point and the slots wide open, you would have full control of the machine longitudinally through the tail and elevator, whereas at the present day if you stall a machine enough to get the full benefit of slots, your tail stalls, your elevators are put out of action altogether, and your rudder gets mixed up in the current from the stalled tail plane and ceases to function.

Without setting up to be any kind of a scientist, I believe that this fact is largely accountable for slots not being used as they should be used.

A Revised Version.

Now let us take a look at what our twin-engined pusher monoplane is going to be like if we start using slots as they should be used.

We can build our engines flat into the wing, and I think we can carry our petrol-tanks in the thickness of the wings, between the fuselage and the engines.

All that part of the wing from the fuselage to the outside of the cylinder-heads will therefore be a fixture.

Outside that we can build a rotatable wing, or at any rate a wing the angle of which can be varied considerably.

Just about the time of the Aero Show in July, and to a certain extent since then, there has been talk about mono-spar wings. There is the type invented by Mr. Stieger and Squadron Leader Haig. There is also a type of wing patented by Mr. Williams of the Fairey Company, such as is used in the Fairey long-range monoplanes. I rather think that it also could be fixed to a variable-angle mechanism in such a way as to use it practically as a mono-spar wing.

Then there is also the type of wing used by the German gliders, as already mentioned, in which there is one single spar of a comparatively ordinary type made into a box by a plywood leading edge. With a wing of this sort we might conceivably improve our performance by having a flexible trailing edge.

Just what the effect would be of using a mono-spar leading edge with slots, plus a flexible trailing edge and a very small chord with a very long span, Heaven only knows. It would look rather queer. But anything new looks queer, and the thing which may look ugly at first may come to be regarded as beautiful afterwards, when the eye becomes used to it.

Anyhow, I suggest that something of this sort might be an experiment worth trying.

(To be continued.)

THE ROYAL AERO CLUB.

The Annual General Meeting of the Royal Aero Club will be held at 3, Clifford Street, W.1, on March 26, at 20.30 hrs.

Notices of Motion for the Annual General Meeting, signed by at least five members, must be received by the Secretary not less than twenty-one days before the meeting.

In accordance with the rules, the Committee shall consist of 18 members. Members are elected to serve for two years, half the Committee retiring annually.

The retiring members of the Committee, who are eligible for re-election, are:—Air Vice-Marshal Sir W. Sefton Brancker, K.C.B., A.F.C., H. S. Broad, A.F.C., Major C. J. W. Darwin, D.S.O., A. H. Downes-Shaw, Major A. R. Goodfellow, Colonel F. Lindsay Lloyd, C.M.G., C.B.E., Lieut.-Col. J. T. C. Moore-Brabazon, M.C., Lieut.-Col. M. O'Gorman, C.B., Major H. A. Petre, D.S.O., M.C.

Any two members of the Club may nominate a member to serve on the Committee provided the consent of the member has been previously obtained. The name of the member thus nominated, with the name of his proposer and seconder, must be received not less than 14 days before the Annual General Meeting.

The General Meeting will be preceded at 19.30 hrs. by a House Dinner. The price of the Dinner will be 6 shillings. Members wishing to attend are requested to notify the Secretary.

KING'S CUP AIR RACE.

The Race for the Cup presented by His Majesty The King, will take place on Saturday, July 5. The Race this year will be confined to one day only and the course will be approximately 750 miles.

The start and finish will be in London and the most northerly control will be at Newcastle-on-Tyne. The Regulations will be issued shortly.

LE CHALLENGE DE TOURISME INTERNATIONAL.

The regulations for the 1930 Challenge de Tourisme International, which will take place between July 20 and Aug. 7, are now available.

This year's contest is being organised by the *Aero-Club von Deutschland* and the Aero Clubs of the following countries are participating: Czechoslovakia, France, Great Britain, Poland, Spain and Switzerland.

As last year, the contest is open to light aircraft which will be divided into two categories:—1st category for two-seat aircraft, which weigh less than 400 kgs. (880 lbs.) empty; 2nd category for two-seat aircraft, which weigh less than 280 kgs. (616 lbs.) empty. A tolerance of 15 per cent. over the empty weight will be allowed on condition that the required range and equipment is not impaired.

The contest will take place at Berlin and the European circuit with twenty-seven obligatory stops, will be as follows: Berlin, Brunswick, Frankfurt-am-Main, Reims, St. Inglevert, Bristol, London (Heston), St. Inglevert, Paris (Orly), Poitiers, Pau, Saragossa, Madrid, Seville, Albacete, Barcelona, Nimes, Lyon, Lausanne, Berne, Munich, Vienna, Prague, Breslau, Cracow, Warsaw, Königsberg, Dantzig, and Berlin. The total distance of the circuit will be about 7,500 kms. (4,660 miles).

The above circuit will be flown over between July 20 and July 31, after which the survivors will undergo tests for fuel consumption, take-off, landing, and be examined for technical qualities, comfort, equipment, etc.

The maximum number of points which can be awarded will be 500, to be divided as follows:—Regularity on the European circuit: 75 points; Average speed over the circuit: 195 points; Technical qualities: 140 points; Take-off and landing: 60 points; Fuel consumption: 30 points.

The principal prize, the *Coupe Challenge*, offered by the *Aéro Club de France*, will be awarded to the competitor placed first in the general classification who must score at least 300 points. Twenty cash prizes to the total value of 350,000 francs will also be awarded.

All British entries will be made through the Royal Aero Club and these must be received by the *Aéro Club von Deutschland* not later than Apr. 15, 1930.

Full particulars as to the rules, regulations, entry forms, etc., can be obtained from the Secretary, the Royal Aero Club, 3, Clifford Street, London, W.1.

THE LATEST DEVELOPMENTS OF AERO ENGINES.

On Thursday, Feb. 27, Mr. A. J. Rowledge will lecture before the Royal Aeronautical Society on the progress which has been made during the past six years on Water-cooled Engines. Mr. Rowledge, who is Assistant Chief Engineer to Rolls-Royce Ltd., is one of the leading authorities on water-cooled engines in this country.

The lecture, a joint one with the Institution of Automobile Engineers, will begin at 19.45 hrs. Light refreshments will be served free from 19.15 hrs. onwards in the Library of the Royal Society of Arts, 18, John Street, Adelphi, W.C.2.

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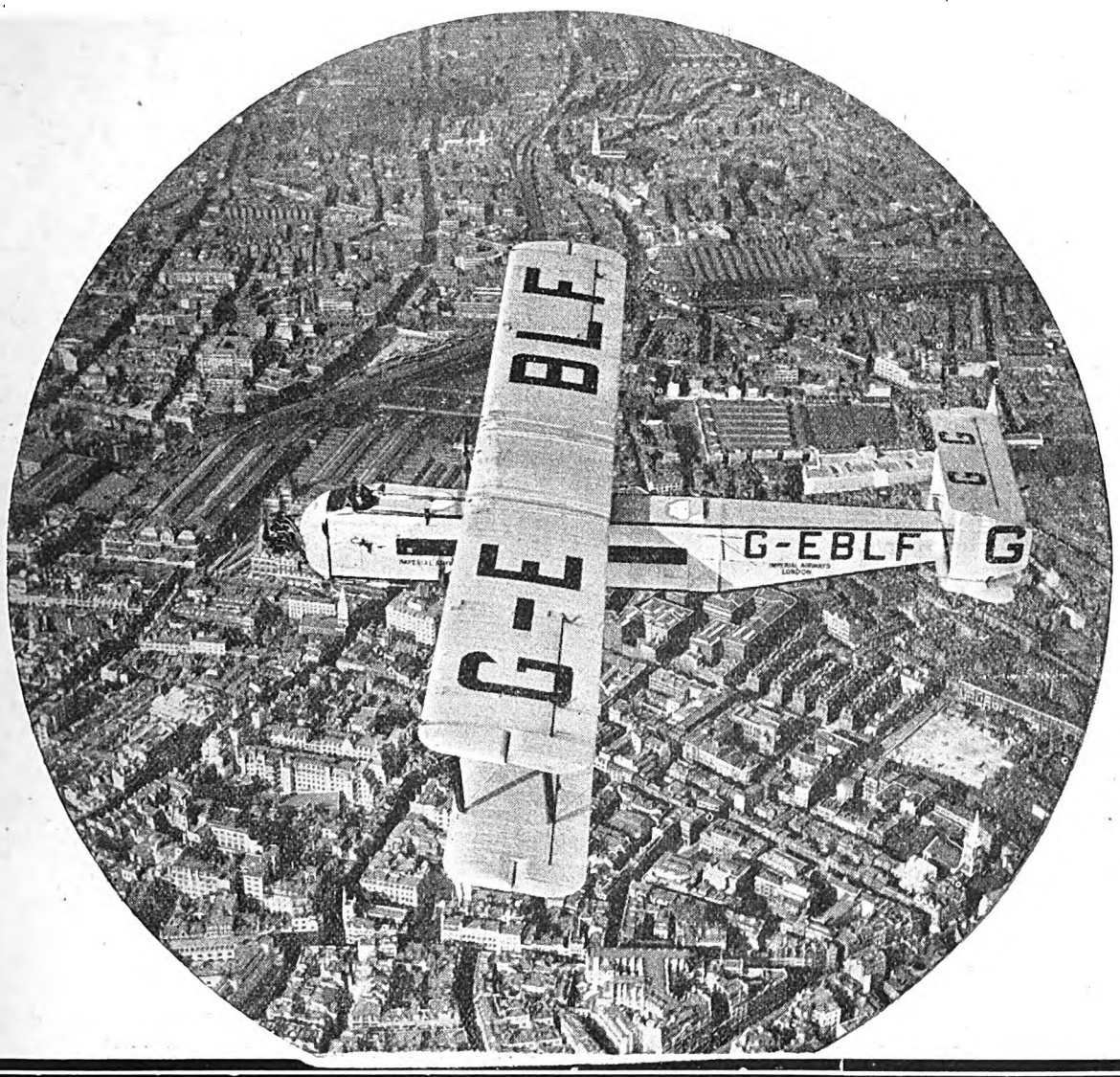

919,320 Argosy Miles

DURING the past 4 years (to October 31st, 1929), seven Argosies in the European Fleet of Imperial Airways Limited have flown 919,320 miles in 10,118 hours. They have carried over 50,000 passengers; they have crossed the channel nearly 4,000 times.

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AN AERO SHOW IN SWEDEN.

An International Aero Exhibition will be held in Stockholm between Sept. 6 and 28, 1930.

The Exhibition has been arranged by the Royal Swedish Institute for Scientific Industrial Research and the Swedish Royal Aero Club, under the patronage of H.R.H. the Crown Prince of Sweden. The Chairman will be Major-Gen. K. A. B. Amundsen, Chief of the Swedish Royal Air Force.

It will be held at the Air Port of Stockholm, which is directly connected with the European air traffic system and offers good facilities for the demonstration of landplanes and seaplanes.

Special accommodation is being erected on the outskirts of the Air Port near the seaplane slipways. One building will house the permanent exhibits of aircraft, aero-engines, accessories, materials, aerodrome equipment, air transport, historical and other exhibits. Seven sheds, containing stands, will house aircraft which may be removed during the exhibition for demonstration flights. Also a limited amount of space in the open near the seaplane slipways will be available by special agreement.

A programme of flying competitions, displays and visits of foreign aircraft is being arranged. All will hope that British aircraft will be adequately represented. Full information concerning the prices and allotment of space and other necessary information can be obtained from the Secretary of the Internationella Luftfartsutställningen i Stockholm (Ilis), Kungsgatan 33, Stockholm. Applications for space must be in the hands of the Committee by May 15, 1930.

FRANCE-PONDICHERRY.

On Jan. 17 MM. Girier and Weiss left Istres, near Marseille, in a Breguet XIX (600 h.p. Hispano-Suiza engine) to fly to Pondicherry, Madras, a French colony on the east coast of India.

They reached their destination on Jan. 28 by flying by way of Tunis, Benghazi, Alexandria, Baghdad, Bushire, Karachi and Bombay. They were detained at Baghdad and Bushire by bad weather. The total distance from Istres to Pondicherry is about 6,000 miles.

They have since attempted the return flight but their machine has been badly damaged in Rome.

MORE FRENCH RECORDS.

On Feb. 15 MM. Costes and Codos took off from Istres aerodrome in a Breguet XIX. biplane (600 h.p. Hispano-Suiza engine) in an attempt to beat the World's Records for distance and duration carrying a useful load of 1,000 kgs. (2,200 lbs.).

They landed at 10.08 hours on Feb. 16 after having remained in the air for 18 hours 1 min. 20 sec., and covered a distance of 3,275 kms. (about 2,040 miles).

The previous record for duration carrying 1,000 kgs. was held by Herr Fritz Horn, who on April 4, 1927, remained in the air for 14 hours 23 min. 45 sec. in a Junkers G-24 monoplane (three 230 h.p. Junkers engines). The previous record for distance was held by Herr Steindorf, who on July 31, 1927, covered a distance of 2,315.338 kms. (about 1,440 miles) in a Rohrbach Roland monoplane (three 230 h.p. B.M.W. engines).

THE COST OF AIRSHIPS.

According to *The Times*, Lord Thomson, Secretary of State for Air, speaking at Cardiff on Feb. 14, said there had been wild exaggerations about the money spent on airships. The total amount spent on the programme since 1924 was £2,000,000. The two ships that had been constructed had given added knowledge, and a country such as ours must pay for its research.

The airship had been invaluable so far as Transatlantic aviation was concerned. To date, 427 people had flown the Atlantic, and 402 of these completed the crossing in airships. The R.101 was strong enough to stand any gale. Given a good skipper and a good crew, he would go out in the R.101 in any weather.

With regard to the future development of airships, they knew that they could be built for about £600,000. They could carry 40 passengers and could complete the journey to India or Montreal in three and a-half days.

After that the public would determine whether airships were going to be a commercial proposition. At any rate, Great Britain had given the lead to the rest of the world.

THE AIRSHIP R.100.

In the House of Commons on Feb. 5, in reply to a question by Mr. Mander, the Under-Secretary of State for Air said that fine weather was so essential for short flights that he thought it better to make no arrangements at present for a flight by Members of Parliament.

In reply to Captain Balfour, on the same day, Mr. Montague said that the R.100 was not considered suitable for use in tropical climates while fitted with petrol engines, and her operations would consequently be confined at first to northern latitudes. For the present she would not be re-engined with compression-ignition engines, as used in R.101, as these were still in the experimental stage.

[This continued objection to petrol engines in warm climates seems rather over-done when one considers the successful voyage of a Zeppelin from Bulgaria to German South-West Africa and back in 1917. Is it that the Government has decided that only a Socialist ship must be allowed to visit Bolshevik India, and that the Capitalist ship must be kept out in the cold?—C. G. G.]

ABOVE THE WORLD.—A Vickers Vespa (Bristol Jupiter engine) belonging to the Bolivian Army Air Service over the mountains.

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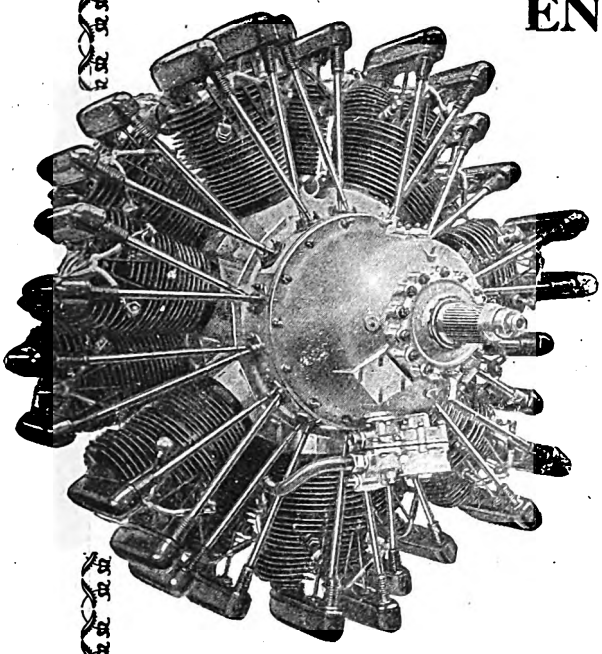
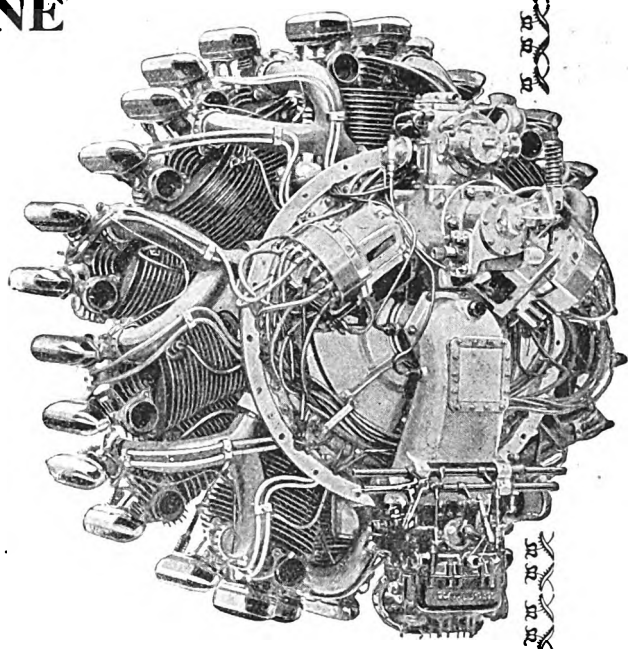
A New ARMSTRONG SIDDELEY ENGINE





The

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THE Jaguar Major is a brilliant addition to the world-famous range of Armstrong Siddeley air-cooled engines. It is made in two types, one with geared fan rated at 525 h.p. at 3,000 feet and developing a maximum of 560 h.p. at sea level, and the other with supercharger rated at 500 h.p. at 11,500 feet and developing a maximum of 450 h.p. at sea level.

The power weight ratio of these two types is 1.75 lbs. (.79 Kg.) per h.p. for the geared fan and 1.98 lbs. (.9 Kg.) per h.p. for the supercharger, while the overall diameter is 46.75 in. (1.187 m).

ARMSTRONG SIDDELEY MOTORS LTD.,
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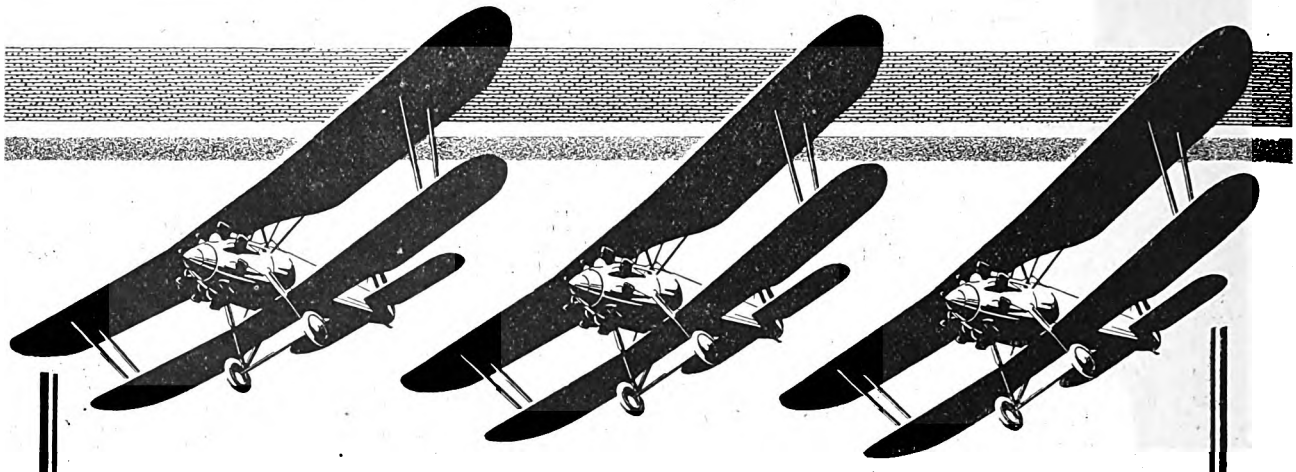

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THE ROYAL AIR FORCE.

The London Gazette.

Air Ministry, February 11.

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—Plt. Off. on probation L. V. G. Barrow is confirmed in rank (Feb. 7); Plt. Off. J. M. Wells is promoted to the rank of Flg. Off. (Jan. 14).

Wing Cdr. H. G. Smart, O.B.E., D.F.C., A.F.C., ceases to be seconded for duty with the Royal Australian Air Force (Feb. 5); Sq. Ldr. G. F. Breese, D.S.C., is placed on the half-pay list, scale A (Feb. 5); Flg. Off. C. S. Horne relinquishes his S.S. comn. on account of ill-health (Feb. 12); Lt. A. A. Murray, R.N., Flg. Off., R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (Feb. 3).

STORES BRANCH.—Plt. Off. on probation R. G. Seymour is confirmed in rank and promoted to the rank of Flg. Off. (Jan. 10).

MEDICAL BRANCH.—A. H. Barzilay, MB., Ch.B., is granted a S.S. comn. as a Flg. Off. for three years on the active list with effect from and with seniority of Jan. 17, and is seconded for duty at the Royal Southern Hospital, Liverpool.

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—Flt. Lt. A. H. Dalton is granted a comn. in Class A (Jan. 17); Flg. Off. C. C. Clark is confirmed in rank (Jan. 23); Flg. Off. F. O. Burnley relinquishes his comn. on completion of service (Sept. 1, 1929).

MEDICAL BRANCH.—Flg. Off. T. Glynn relinquishes his comn. on completion of service (Jan. 23).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 600 (CITY OF LONDON) (BOMBER) SQUADRON.—The following Flg. Offs. to be Flt. Lts.:—G. W. H. Wallcousins (Dec. 15, 1929); W. R. Massey (Jan. 1); T. Courtis (Jan. 18). Flt. Lt. A. H. Dalton resigns his comn. on appointment to the Reserve of Air Force Officers (Jan. 17).

The following Flg. Offs. to be Flt. Lts.:—No. 601 (COUNTY OF LONDON) (BOMBER) SQUADRON.—H. N. St. V. Norman (Jan. 1).

No. 602 (CITY OF GLASGOW) (BOMBER) SQUADRON.—J. S. Lennox (Dec. 15, 1929); D. E. McIntyre (Jan. 1); D. Douglas-Hamilton, Marquess of Douglas and Clydesdale (Jan. 15).

No. 603 (CITY OF EDINBURGH) (BOMBER) SQUADRON.—A. R. H. Miller (Dec. 15, 1929); J. M. Fosbrooke (Jan. 1); A. H. Bruce (Jan. 16).

No. 605 (COUNTY OF WARWICK) (BOMBER) SQUADRON.—J. M. Leach (Dec. 15, 1929); C. L. Knox, V.C. (Jan. 1); G. V. Perry (Jan. 15).

Appointments.

Air Ministry, February 14.

GENERAL DUTIES BRANCH.—Squadron Leaders A. G. Bishop, A.F.C., to Electrical and Wireless School, Cranwell, 7/1. P. Huskinson, M.C., to No. 41 Sqdn., Northolt, 1/2. R. S. Aitken, M.C., A.F.C., to No. 25 Sqdn., Hawkinge, 6/2.

Flight Lieutenants R. Y. Eccles, to No. 8 Sqdn., Aden, 3/2. C. H. Scofield, to No. 4 Sqdn., South Farnborough, 6/2. A. E. Beilby, to No. 36 Sqdn., Donibristle, 10/2. R. Jones, to No. 100 Sqdn., Bicester, 22/1. C. F. Steventon, to School of Photography, South Farnborough, 30/1. F. L. Hopps, A.F.C., to R.A.F. Depot, Uxbridge, 16/12. S. C. Strafford, D.F.C., to R.A.F. Depot, Uxbridge, 1/2. E. H. Richardson, to No. 35 Sqdn., Bircham Newton, 3/2. G. H. Mills, to Station H.Q., Bircham Newton, 3/2. C. W. Harrison, to No. 1 F.T.S., Netheravon, 3/2. C. B. S. Spackman, D.F.C., to R.A.F. Depot, Uxbridge, 8/1.

Flying Officers E. J. Hill, to No. 101 Sqdn., Andover, 3/2. C. H. V. Hayman, to No. 1 Stores Depot, Kidbrooke, 5/2. A. F. Lingard, to No. 8 Sqdn., Aden, 3/2.

Pilot Officers E. G. Sharp, to No. 36 Sqdn., Donibristle, 10/2. C. W. Black, to No. 2 Armoured Car Company, Middle East, 3/2. E. C. Durbin, to No. 2 Armoured Car Company, Middle East, 19/1.

MEDICAL BRANCH.—Air Commodore J. McIntyre, M.C., to R.A.F. Depot, Uxbridge, 27/1.

Squadron Leader R. S. Overton, to No. 22 Group H.Q., South Farnborough, 28/2.

Flight Lieutenants J. D'I. Rear, to Princess Mary's R.A.F. Hospital, Halton, 22/2. P. D. Barling, to Station H.Q., Hornchurch, 1/2. W. S. Stalker, to Station H.Q., Kenley, 1/2. C. P. O'Toole, to Station H.Q., Mount Batten, 28/1. J. B. Murphy, to R.A.F. Training Base, Leuchars, 3/3.

Flying Officers J. L. Groom, to No. 1 F.T.S., Netheravon, 6/3. P. J. Nyhan, to R.A.F. Depot, Uxbridge, 6/2. A. H. Barzilay, to Special Duty List, on appointment to a S.S. Comn., 17/1. J. Murphy, to No. 2 F.T.S., Digby, on appointment to a Temp. Comn., 3/2.

STORES BRANCH.—Flying Officers F. W. Felgate, to H.Q., Iraq Command, 5/12. J. E. R. Sowman, to No. 70 Sqdn., Iraq, 8/10. M. S. Shapcott, to No. 5 Sqdn., India, 12/1.

ACCOUNTANT BRANCH.—Flight Lieutenant R. F. C. Metcalfe, to Station H.Q., Hornchurch, 4/2.

The Director of R.A.F. Medical Services.

The Air Ministry announces that Air Vice-Marshal David Munro, C.B., C.I.E., M.B., Ch.B., F.R.C.S. (Edin.), K.H.S., Director of Royal Air Force Medical Services, will be placed on the retired list with effect from Mar. 1, 1930.

Air Commodore John McIntyre, M.C., M.B., B.Ch., has been selected to succeed Air Vice-Marshal Munro as Director of Royal Air Force Medical Services with effect from the same date.

Air Vice-Marshal Munro is taking up the appointment of Secretary to the Industrial Health Research Board under the Medical Research Council.

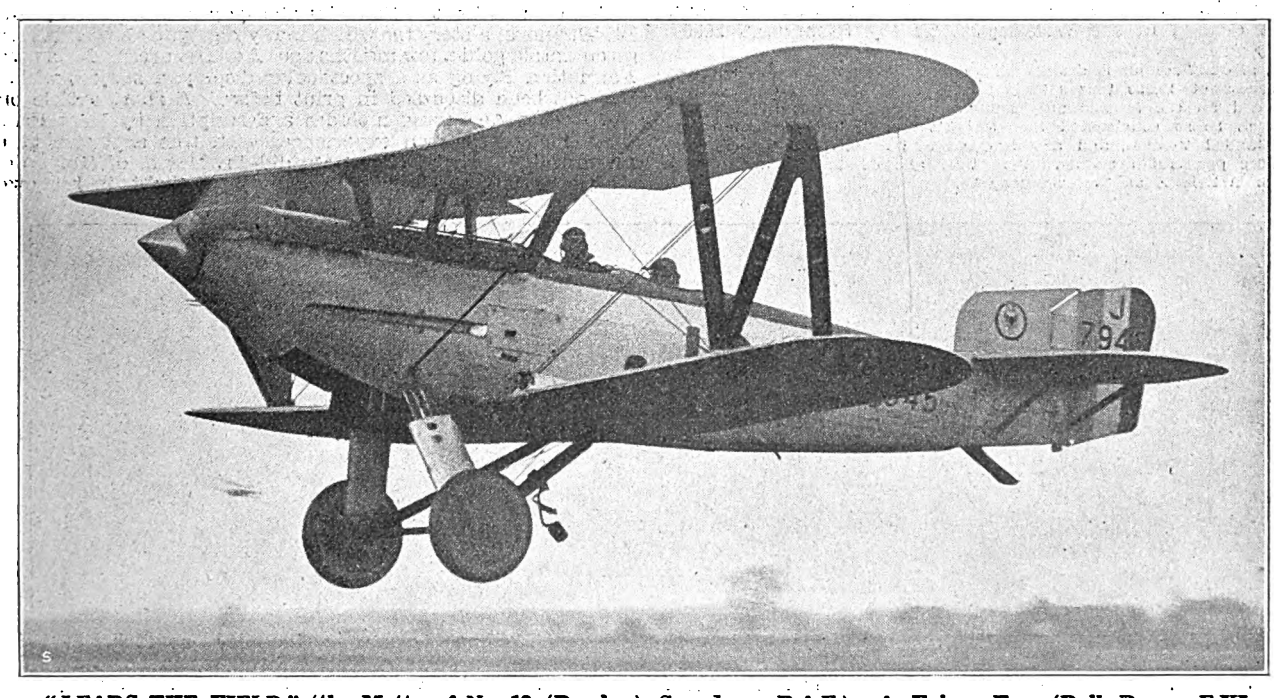
Air Vice-Marshal Munro.

Air Vice-Marshal David Munro, C.B., C.I.E., M.B., Ch.B., F.R.C.S., K.H.S., was born in 1878 and was educated at St. Andrews and Edinburgh University.

He entered the Indian Medical Service in 1902 and served in the Military Department and in the Bengal Civil Medical Department until 1914. From 1914 to 1919 he served with the Indian Medical Service in France, Mesopotamia and Palestine and was largely responsible for reorganising the medical services during the early stages of the campaign in Mesopotamia. He was decorated with the C.I.E. and twice mentioned in Dispatches.

He transferred to the R.A.F. Medical Branch in 1919 with the rank of Wing Commander and was appointed Principal Medical Officer in India. He was promoted Group Captain in December, 1920, and in November, 1921, he was promoted Air Commodore and appointed Director of Medical Services, R.A.F.

He was appointed a Companion of the Order of the Bath in January, 1924, and in 1925 he was promoted to Air Vice-



"LEADS THE FIELD" (the Motto of No. 12 (Bomber) Squadron, R.A.F.).—A Fairey Fox (Rolls-Royce F.XI engine) of No. 12 (B) Squadron, leaving the aerodrome at Andover. —(*"Aeroplane" photograph.*)

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Marshal and appointed an Honorary Surgeon to His Majesty the King.

Air Vice-Marshal Munro will long be remembered in the R.A.F. as a wise, kindly and efficient Director of Medical Services who put the general good of the Service before everything, as well as a keen supporter of every kind of sport in the R.A.F.

Air Commodore McIntyre.

Air Commodore John McIntyre, M.C., M.B., Ch.B., was born in 1880 at Byker, Newcastle-on-Tyne, and was educated at Clifton School, Bristol, King's College, Cambridge, and St. Mary's Hospital, London.

He joined the Royal Army Medical Corps in 1915 and served with distinction in France. In November, 1916, he was awarded the Military Cross for conspicuous gallantry and devotion to duty in tending and dressing wounded under heavy fire with great courage and determination, he himself being four times buried by shell-fire. He was promoted Captain in December, 1916, and Major in May, 1918.

On the formation of the R.A.F. in April, 1918, he was transferred to that Service and employed on medical staff duties at the Air Ministry. In November, 1918, he was promoted to the temporary rank of Lieut.-Colonel, and in August, 1919, he was granted a permanent commission in the R.A.F. Medical Branch with the rank of Wing Commander. He remained at the Air Ministry until 1923 when he was appointed Principal Medical Officer to the R.A.F. in India.

He was promoted Group Captain in 1927 and appointed Principal Medical Officer, R.A.F., Halton Command. He was promoted Air Commodore in 1929.

A Fatal Accident.

The Air Ministry regrets to announce that as the result of an accident at Kenley, Surrey, to a Siskin machine of No. 32 (Fighter) Squadron, Kenley, on Feb. 13, 1930, No. 350944, Sergt. Cecil Alfred Arthur Fell, the pilot and sole occupant of the aircraft, was killed.

Special Assessments.

The following name should be added under the heading of Distinguished Pass to the list of Special Assessments at No. 2 F.T.S., published in THE AEROPLANE of Feb. 5: No. 362015, Sjt. Boyd, W. P.

Service Support for the Clubs.

The Air Council has given permission for the Royal Air Force to assist at four of the flying meetings arranged for the coming season.

The R.A.F. will take part in displays at the Leicestershire Meeting on Apr. 19; at the official opening of Bristol Municipal Aerodrome on May 31; at the Norwich Flying Meeting on July 26; and at the Liverpool Air Pageant on Sept. 30.

The Definition of Aircraft Carriers.

In the House of Commons on Feb. 12, Major Ross asked the First Lord of the Admiralty whether there was any recognised definition of the term aircraft carrier: and whether a warship capable of flying off aircraft must always be so described.

Mr. Alexander said that the term "aircraft carrier" had been defined in the Washington Treaty (Command 2036/1924) as follows:—

An aircraft carrier is defined as a vessel of war with a displacement in excess of 10,000 tons (10,160 metric tons) standard displacement designed for the specific and exclusive purpose of carrying aircraft. It must be so constructed that aircraft can be launched therefrom and landed thereon, and not designed and constructed for carrying a more powerful armament than that allowed to it under Article IX or Article X as the case may be.

Unless a warship was capable of flying on aircraft she did not come within this definition.

[The Staff of THE AEROPLANE have heard aircraft carriers defined in briefer terms.]

The Question of Plain Clothes.

In the House of Commons on Feb. 12, Captain Hall asked the Under-Secretary of State for Air whether he was aware that considerable dissatisfaction existed among men in the Air Force because they were not allowed to walk out in civilian clothes when off duty: and whether, seeing that this privilege was granted to men serving in the Navy and Army he proposed to extend the same privilege to men serving in the R.A.F.

Mr. Montague said that he had no reason to suppose that the present rules with regard to the wearing of plain clothes by airmen are contrary to the general feeling in the R.A.F. He understood that naval ratings were not allowed to enter or leave their ships or establishments except in uniform.

[King's Regulations Paragraph 203 A (2) reads:—

Permission may be given by a C.O. to warrant officers and N.C.O.'s and to aircraftmen of V.G. character, to dress in plain clothes while on leave for a period of over 48 hours away from their station. Station bounds are to be defined in unit station orders . . . . plain clothes will not be worn by airmen when actually leaving or returning to their station.]

Officers' Subsistence Allowances.

In the House of Commons on Feb. 12, Captain Balfour asked the Under-Secretary of State for Air whether any reductions had recently been made in the scale of subsistence allowance payable to R.A.F. officers while temporarily away on duty from their stations, and if so the amount of such reductions and the reasons which had caused this alteration in the scale of payments.

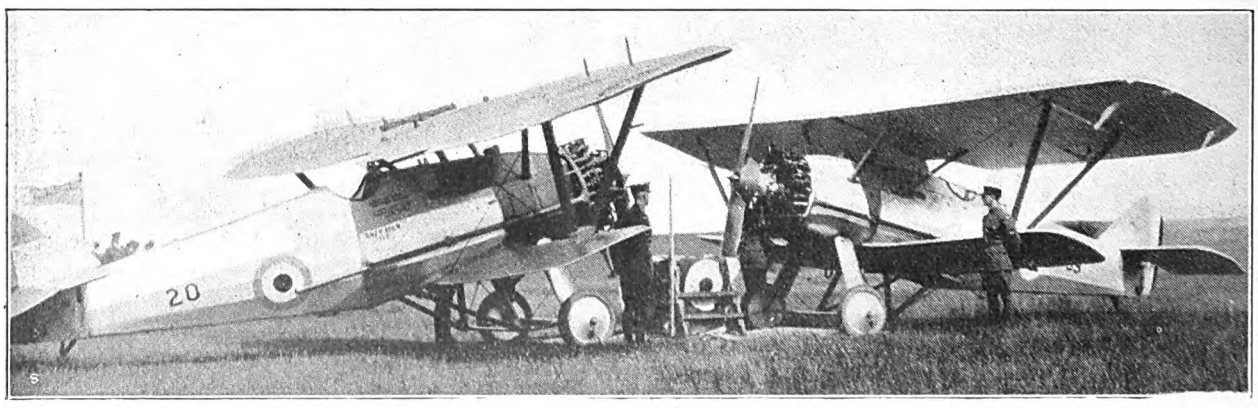
Mr. Montague circulated a reply to the effect that as from Apr. 1 next the rates of subsistence allowance were being revised and in general reduced. His table showed that roughly the reduction would be at the rate of 5s. a night for senior officers and 2s. 6d. a night for junior officers. In cases where rations and accommodation are provided the reductions will be at between 30 and 40 per cent. Mr. Montague added that the revised rates would not be subject to deduction of rations allowance, at present 1s. 7d. a day, as were certain of the present rates. The revision of subsistence allowances formed part of a wider revision of allowances as a whole and of travelling concessions, the effect of which was, in general, favourable to the officers concerned.

[Mr. Montague might at the same time investigate the peculiar arrangement whereby officers' allowances are taxed at source at the full rate for unearned income.]

The Cranwell Magazine.

The Spring, 1930, issue of *The Journal of the Royal Air Force College* is, if possible better than its predecessors. There are 100 pages of reading matter, every paragraph of which is interesting and instructive, and 18 illustrations including a coloured frontispiece of the Supermarine-Rolls-Royce which won the Schneider Trophy.

The contest for the Schneider Trophy is described by Flt. Lt. Waghorn, a story for which many newspapers would have given untold gold a few months ago. Another article deals with Formation Flying as a spectacular display, a subject which has not been discussed in print before. A short article on the Rocket Aeroplane includes a description by Herr Fritz Von Opel of his own experiences with this explosive type of aircraft. Flight Cadet Majdid-din Naqib, of 'Iraq, describes his life at Cranwell and his first flight, in his own



CANADIAN FIGHTERS.—Two Armstrong Whitworth Siskins (460 h.p. Armstrong Siddeley supercharged Jaguar engines) of the Royal Canadian Air Force at Camp Borden, Ontario. These two machines were christened "Sir John Alcock" and "Sir Arthur Whitten Brown" on the occasion of the tenth anniversary of the first Trans-Atlantic Flight.

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delightful English. The official account of the gallant deed for which Flight Cadet Serjeant McKechnie was awarded the M.B.E. is published side by side with his own account of the incident given at a Court of Inquiry.

The various activities of the College during the past six months, including sports, appear as usual with illustrations and former Cadets have contributed articles on service and sports abroad which cannot fail to interest those present Cadets whose future will lie in those countries. The Editor of The Aeroplane has contributed his ideas of an Ideal Pilot, an article which contains some good advice to young pilots but which will not make the writer very popular with the R.A.F. Medical Branch.

Copies of *The Journal of the Royal Air Force College* can be had from the Manager, R.A.F. Cadets' Mess, Cranwell, Lincs, for 4s. each, post free.—C. M. MCA.

Rugby Football.

The R.A.F. were beaten by Middlesex County at the Old Deer Park, Richmond, on Feb. 12, by 5 goals and 2 tries (31 points) to a goal and a try (8 points). The Middlesex team included a number of International players. The R.A.F. team was an experimental one apparently. Behind the scrum the only player who was in the team against the Navy was Flg. Off. Pott and among the forwards, AC. Jennens and Flg. Off. Fitch were new to the team. Quite why the R.A.F. Selection Committee chose to try out new players against a County team and in front of a small but very expert crowd of spectators, is difficult to understand. Experiments of this sort should be made in the privacy of an Air Force station at least two months before the R.A.F. is advertised to meet another team.

The match brought one fact to light and that was that Flg. Off. Norwood and Plt. Off. Elsmie are likely to make a very useful pair of halves. They worked well together and in happier circumstances should put up a very good show. In this match they were opposed by H. C. Laird (England) and W. C. Powell (Wales). The first R.A.F. try was entirely their doing and was the result of an enterprising combination which utterly defeated their opponents. Throughout the game they fought a lost battle with tremendous vigour and initiative. They got a little help from Flg. Off. Pott and a certain amount from some of the forwards. The rest of the team were hopelessly outclassed. In the last few minutes of the game Sjt. Kerby led a forward rush right down the field and over the line.—C M. MCA

Inter-Service Rugger in Egypt.

The annual Rugby Football match between the Army in Egypt and the R.A.F. in Egypt was played at Cairo on Jan. 27 and resulted in a win for the R.A.F. by 3 goals and 2 tries (21 points) to one goal (5 points).

Extracts from the account of the game which appeared in *The Egyptian Gazette* state:

The score in no way flattered the winners, who were superior at all phases of the game. The whole success of the Airmen can be attributed to team work, as against individuals. At back, Casey for the Airmen was sounder than his vis-a-vis Welchman; his kicking was perhaps not quite as strong but he found touch better and was always the keener tackler. The Army three-quarters showed little combination, both Simpson and Goddard being much below their usual form; the latter would have been much more at home in his usual position at stand-off half. The Airmen's halves were also superior to the Army's pair.

After the resumption the Army forwards improved tremendously and for a time they more than held their own. Clark indulged in a good dribble but was tackled in possession when only 10 yards from the line. After 10 minutes the Army attack gradually fizzled out and the Airmen took control of the game. Following a scrum, Philpotts obtained possession and went over near the post, for Dixon to succeed with the kick and make the score 13—5 in favour of the Airmen, 13 minutes after the second half had started. Later, a good bout of passing between all the Air Force 3's, resulted in Mackay touching down for the fourth try near the corner, but Dixon failed with the difficult kick. Shortly after, Lawrence made ground with a good run, but was pushed into touch; he felf rather heavily with his leg under him and had to be taken to hospital with a broken ankle. In spite of the handicap the Airmen held the upper hand and before the close Patch went over for a further try, Dixon converting with the last kick of the game.

Association Football.

The R.A.F. beat the Civil Service at Chiswick on Feb. 12 by one goal to none.

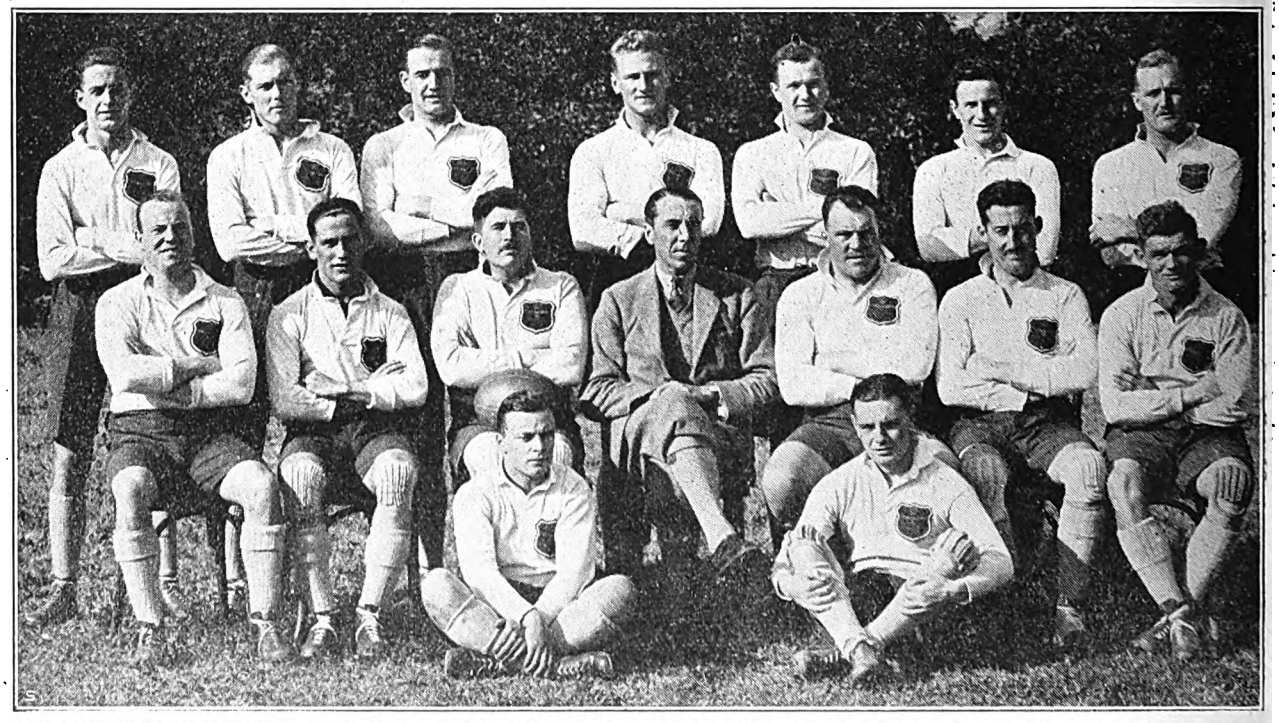
After about twenty minutes' play in the Civil Service half of the field Acquaroff scored the only goal of the game. The Civil Service played better football in the second half, against the wind, but the determined Air Force tackling and the steadiness of the goalkeeper kept them out. The R.A.F. team were:

AC. Chaston (Uxbridge), goal; Cpl. Pond (Henlow) and L-AC. James (Netheravon), backs; Sjt. Trout (North Weald), Cpl. Robinson (Henlow), and AC. Armstrong (Eastchurch), half-backs; Flg. Off. C. H. Sleightholme (Mount Batten), AC. Kelly (Henlow), L-AC. Vernon (Halton), Sjt. Acquaroff (Worthydown), and AC. Seabright (Tangmere) forwards.

Hockey.

The R.A.F. were beaten by the Army at Aldershot on Feb. 12 by three goals to one. The game was very fast throughout. In the first half, when no goals were scored, the game was generally in mid-field, but in the second half the Army got into their stride, and scored after two minutes' play. After the Army's third goal, the Air Force scored with a fine shot by Lascelles. The R.A.F. team were:

Cpl. C. Butler (Stanmore), goal; Cpl. L. G. Beeton (Henlow) and Flg. Off. W. K. Beisiegel (Donibristle), backs; L-AC. L. R. Hobbs (Uxbridge), Sjt. W. C. Maher (Upavon), and Flg. Off. H. E. Sales (Bicester), half-backs; Flg. Off. N. M. Jerram ((Halton), Plt. Off. D. P. Lascelles (Tangmere), L-AC. F. Connell (Gosport), Flg. Off. S. C. Dufton (Bicester), and Flt. Lt. H. N. Hampton (Digby), forwards.



THE WINNERS.—The R.A.F. in Egypt Rugby Football Team which beat the Army in Egypt on Jan. 27 by 21 points to 5. Standing: L-AC. McKay (H.Q.M.E.), L-AC. Laker (Depot), L-AC. Sessford (H.Q.M.E.), L-AC. Lewis (4 F.T.S.), L-AC. Sully (4 F.T.S.), L-AC. Lawrence (Depot), Flg. Off. Parkin (6 Sqdn.). Sitting: Flg. Off. Noble (208 Sqdn.), L-AC. Nunn (S.H.Q.), Flt. Lt. O'Malley (S.H.Q.), Group Capt. Pierce (President, R.A.F.R.U), Flt. Lt. Chichester (4 F.T.S.), Flg. Off. Patch (45 Sqdn.), L-AC. Casey (Depot). On the ground: Flg. Off. Dixon (4 F.T.S.), Flg. Off. Philpot (4 F.T.S.).

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THE AUTOGIRO.

On Feb. 13, at 18, John Street, Señor J. de la Cierva read a paper on the Autogiro before the Royal Aeronautical Society. This paper was a sequel to that in which, four and a half years ago, the lecturer first described to the Society his remarkable discoveries.

Señor de la Cierva explained that his paper was to tell how the crude autogiros of 1925 have been developed into practical flying machines. In the paper he also dealt with a number of theoretical points in justification of his claims for the autogiro.

The autogiros recently produced have no better performance than the equivalent conventional aeroplanes. Their top speed and climb are inferior, but their angle of climb is steeper and their minimum speed is much slower.

The landing qualities of the autogiro are such that a modern machine of the type with proper handling can be landed in perfectly still air with no run at all after touching the ground. In a steep descent of about forty-five degrees the vertical speed of the latest types is not more than 12 to 13 feet per second.

Señor de la Cierva then described the latest type of autogiro, which was described and illustrated in The Aeroplane for July 12, 1929. A demonstration flight of this machine was also described in The Aeroplane for Jan. 15, 1930.

The latest types are no longer transformed aeroplanes. The fuselage, undercarriage, and tail have been modified for the new conditions they have to meet. The outstanding alterations in design are four in number.

The ailerons are now attached to small wings with the tips set at a very large dihedral angle. These wings increase the efficiency in two ways. They give less drag per unit of lift and they relieve the rotor of part of its load. This brings the blades nearer the optimum incidence which is very small.

The fuselage is shorter than in the early models. The undercarriage has considerably increased track. The blades are of different shape and construction and are hinged to allow an up and down movement. They also have hinges at right angles to the first hinge, to allow a certain amount of movement between the blades.

The tail-unit is the special novelty. This is arranged to deflect the slip-stream from the airscrew up through the blades of the rotor and thus act as a starting device. By the use of this device the rotor can be turned up to 60 or 70 per cent. of its maximum r.p.m.

Señor de la Cierva said that as a result of tests made in several countries with autogiros of different types he has obtained a L/D ratio of about 12 for rotors combined with small fixed wings, and about 10 for rotors alone. The lift coefficient appears to be about 1 and the thrust coefficient about 2. These figures apply to the entire disc area and for rotors of about .1 solidity.

He said that an autogiro can be designed to be faster than an equivalent aeroplane, and he showed a slide to illustrate this point. If the diameter of the autogiro equals the span of the aeroplane and if both machines have the same parasite drag, the induced and parasite power would be the same in both cases.

The equations for the horse-power required therefore would differ only in the term corresponding to profile drag. In the aeroplane this term will be proportional to the cube of the speed. In the autogiro this will be directly proportional within wide limits to the speed. Thus the autogiro must become faster.

Señor de la Cierva pointed out that the steepness of climb of the autogiro can be much better than that of the aeroplane, provided that the efficiency of the airscrew does not drop too much at low speeds. This tends to show that geared airscrews are more necessary for the autogiro than for normal aeroplanes.

Autogiros of correct proportions can carry the same normal load as equivalent aeroplanes and have the same ceiling. A definite advantage claimed for the autogiro is its aerodynamical flexibility and adaptability.

The load per square foot of wing area defines the landing qualities of an aeroplane. If the power is increased, an increase in wing loading must follow with a comparative increase in the landing speed. Roughly the landing speed of an aeroplane is proportional to its top speed.

The landing qualities of an autogiro depend almost exclusively on the load per square foot of disc area. The best possible efficiency at top speed it obtained by making the ratio of tip speed to top speed equal to about 1.5. This ratio depends only on actual blade area, assuming the pitch to be constant.

This means that within wide limits, autogiros can be designed to have very different top speeds, but with the same very slow landing speed and vertical descent. A limit comes when the blades have been reduced to three in number and have become too narrow and thin. Two blades are too rough for practical use.

The speed of rotation can be even further increased by a decrease in pitch angle which does, however, slightly increase the minimum speed. Señor de la Cierva thought that tip speed to top speed ratios of about 1 will be used in very fast autogiros of the future. He is satisfied that autogiros can be designed with a top speed of 200 m.p.h. and yet landing as slowly as the latest light autogiro.

Two objections have been raised to the possibility of de-

VERTICAL DESCENT.—Señor de la Cierva making what is known in America as a "tired chicken" landing.

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The AUTOGIRO

1926 ~~~~ 1929

C.19 MARK II

A two-seater light 'plane of wood and metal construction with Armstrong-Siddeley Genet Major 100 h.p. engine.

PERFORMANCE

Top speed	95 m.p.h.
Rate of Climb	500 ft. p.m.
Landing speed	none
Take-off Run	30 yards
Landing Run	none

WEIGHTS & LOADING

Tare Weight	850 lb.
Loaded Weight	1400 lb.
Rotor Loading ...	48.9 lb./sq. ft.
Stabilising 'Plane Loading ...	...3.3 lb./sq. ft.

FULL CAPACITY & RANGE

24½ gallons, 300 miles at 70 m.p.h.

The CIERVA AUTOGIRO CO., LTD.,

BUSH HOUSE, ALDWYCH,
LONDON, W.C.2

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fifty per cent. of the optimum. That is three times the efficiency of the normal parachute.

Señor de la Cierva said that by decreasing the power-loading of the present-day autogiro all the advantages offered by the helicopter can at once be realised. An over-powered autogiro would take-off in 10 or 20 yards, and a 40 to 50 degree angle of climb. The minimum horizontal speed would be 18 m.p.h. These features together with the vertical descent and lack of forward run on landing give the autogiro all the advantages claimed for the helicopter.

Señor de la Cierva said at the conclusion of his paper that the secondary development stage has now arrived in which the co-operation of aircraft constructors generally can be asked. The scope of the work can now be broadened by the participation in it of the Aircraft Industry whose constructive knowledge and genius have not hitherto been available.

In conclusion Señor de la Cierva said that he feels he is very much in debt to his friends and collaborators, to the Air Ministry, the Royal Aeronautical Society, and even to his critics.

The Discussion.

Colonel The Master of Sempill referred to Señor de la Cierva's frank and clear account of the present position of the autogiro and his reasonable claims for the future. He pointed out that the adaptation of the slot since the first appearance of the autogiro four and a-half years ago had somewhat minimised the advantages of the rotating-wing type of machine.

He agreed with Señor de la Cierva that by adopting a light power-loading the autogiro could be made to compete successfully with the helicopter.

He had opportunities since the summer of flying this type of machine and he had been amazed by its performance in the air. One could arrive over one's objective at 1,000 feet and shut off the engine and come down.

He read a letter from Sir Sefton Brancker, who was unable to be present. The Director of Civil Aviation said he was a great believer in the future of the autogiro. It was a comfortable machine in which to fly. He was celebrated for his bad landings and it was nice after one had made a parachute landing from 30 feet to have the pilot say that it was the right way to land the autogiro.

He referred to the four-seater autogiro which Señor de la Cierva had promised him with which he could fly to and from the Horse Guards Parade. The rate of climb of an autogiro was worse than that of a corresponding aeroplane but the angle of climb was much better. He recommended the fitting of a geared airscrew. He wanted to know what would happen to an autogiro in a very strong down current.

After reading this letter Col. Sempill asked Señor de la Cierva which of the three methods of starting the rotor blades was best. He then called upon Mr. Wimperis, to whose initiative and energy the development of the autogiro in this country was due.

Mr. H. E. Wimperis, Director of Scientific Research at the Air Ministry, said he found the paper interesting but he would have liked a fuller account of the work of the last five years. We were so used to the autogiro that the stir it caused at its first appearance was difficult to recollect. He remembered the amazement of the former Chief of the Air Staff, Sir Hugh Trenchard, when he saw the machine really fly at Farnborough.

The autogiro was the only form of rotating-wing machine which so far had made successful cross-country flights. The Air Ministry had had several autogiros built to see whether they could achieve their predicted performances. Although the full tests had not been completed they confirmed Señor de la Cierva's figures.

He thought that the short forward run of the autogiro outweighed all its disadvantages such as lower top-speed, lower rate of climb and fewer m.p.g. when compared with the conventional type of aeroplane. In a fog the aerodrome can easily be found by means of a radio beacon but the difficulty of landing in a fog still remains. Under such circumstances the autogiro gains.

The Air Ministry had done its best to develop a satisfactory starting device, but the scorpion or deflector tail was Señor de la Cierva's own idea. He had hoped that the Guggenheim Competition would have provided an answer to the query that as to whether a super-slotted aeroplane was not better than an autogiro, but unfortunately the two autogiros were withdrawn. Perhaps Señor de la Cierva could tell the Society why.

The tests with the autogiro would continue. His own idea was that the greatest future for the autogiro lay in its development as a light machine for the use of private owners over broken country. He concluded by congratulating Señor de la Cierva on the way he had improved his English since his previous paper.

Mr. R. McKinnon Wood said he regarded the paper as a statement of Señor de la Cierva's faith. He himself was not so optimistic though he was afraid he was somewhat out of date as he was only familiar with the machine of 1925. He too would like to have some more figures and would like to know the reason for the non-appearance of the autogiros at the Guggenheim Competition.

He said that a parachute efficiency of two was hardly possible. He did not think that the theory of vortices could account for this extreme case. He quoted the figures found by experiments with model autogiros at Farnborough which were .6 to .7. The resistance of a flat disc found by Eiffel was .55. The resistance of a hemispherical cup was .75.

Major R. H. Mayo said that he was disappointed that the autogiros did not arrive for the Guggenheim Competition, but he understood that they could not be completed in time. He understood that Señor de la Cierva hoped his machines would satisfy the flat-angle of glide condition. This was the worst test from the point of view of the autogiro, though this disability was outweighed in his opinion by the autogiro's ability to descend vertically.

Mr. C. C. Walker referring to Señor de la Cierva's statement that the autogiro had a higher top speed than an equivalent aeroplane if the horse-power was high enough, said that without figures this was difficult to accept as there was trouble in knowing what kind of aeroplane was used for comparison.

He explained that if the span of the rotor equalled the span of the wing, the resistance of the autogiro must be more as the profile drag varied as the square of the velocity. The mean velocity of the rotor must be more than that of the aeroplane because there was the velocity of rotation as well as the forward speed of the machine. He asked what were the chances of wing-flutter at high speeds.

Major F. M. Green thought the paper would be more valuable if Señor de la Cierva could include some more figures. He would like some more information as to the change in airscrew design which increased the speed by thirty miles an hour.

Professor Hele-Shaw said his connection with aviation began even before the early days. Twenty years ago Señor de la Cierva began his experiments. Four and a-half years ago he read his first paper before the Society amid congratulations, yet no one congratulated him on his immunity from serious accident and on having achieved the object for which he set out, a safe landing with a slow forward speed.

When he was Professor of Engineering at Liverpool University forty years ago, the Mayor sent for him and said that he must stop lecturing about aviation as people were beginning to talk. He recalled how he saw an autogiro make a vertical descent at Bournemouth. He had come there that evening to know where he could obtain a machine of that type.

He had flown in his nephew's Moth but that class of aeroplane landed too fast for him. The lecturer invited the co-operation of the Industry in the development of his invention. Speaking as an inventor he could say that when an invention reached that stage, it had proved itself of practical value.

Mr. D. R. Pye said he had no doubt that the creeper bridges built in various parts of the world by natives had ample factors of safety, but he preferred bridges made of steel. He said that the mere fact of having large pieces of structure flapping up and down and revolving above the machine was bound to prejudice the public. He asked for the opinions of pilots who had flown the machines. The public would have to be educated out of such prejudice before they would accept such a form of conveyance.

He thought that the lower top-speed of the autogiro was important. The only advantage of the aeroplane as a means of transport was its high speed. In a head wind the existing types of light aeroplanes with a passenger and luggage experienced some difficulty in flying from London to Paris non-stop. With the autogiro of similar power this would be impossible without refuelling. He thought that the autogiro was good for night flying or rather that with such a type the risk of danger in a forced landing was much less.

Flt. Lt. H. C. A. Rawson, who is the test pilot for the Cierva Autogiro Co. Ltd., explained that even after a very large number of hours' flying with conventional types he did not find anything unusual with the rotating-wing machine. After taking-off for the first time, one very soon became accustomed to the revolving blades and ceased to notice them. He found the machine to give one an increased sense of security and he had no qualms at flying at 200 feet over ground that in a conventional machine he would treat with great respect and over which he would fly at a much greater height.

The maximum speed range that had been measured on an autogiro was 25 to 112 m.p.h. The English machine had a tested top-speed of 106 m.p.h. with a low speed of 25 m.p.h. and a machine supplied to the Italian Government had a similar performance. He had actually had a minus reading on the air speed indicator, thus showing a vertical descent.

Flt. Lt. D. Bonham-Carter told the story of the inventor's crash which was caused by sheep and how while convalescing he conceived the idea of the autogiro. He referred to a starting device for the rotor which worked by rockets attached to the blades. He queried whether the deflecting tail did not cause undue vibration.

He pointed out that the autogiro was spin-proof and a very nice machine to fly. Experienced pilots found it amusing as there was so much that could be done which was *verboten* on the conventional machine. Objection had been made to the single bearing upon which everything depended, but this worked perfectly well. One soon ceased to notice the movement of the blades in the air.

Mr. W. O. Manning said that the autogiro's ability to take-off at a definite speed and descend on water slowly made it particularly advantageous for seaplane work.

Señor de la Cierva in his reply said that the questions were so complex that even in twenty-four hours he could not answer them all. The autogiro worked very well in bumpy weather. He told of Mr. Rawson's experience when flying an autogiro to Germany. The machine hit a bump and dropped five hundred feet, but everything worked perfectly.

A method for starting the rotor blades by use of the engine is being developed. There is also a system of jet propulsion. The deflector-tail method is the handiest. His entries were not ready for the Guggenheim Competition. Señor de la Cierva said in extenuation that aeroplanes are only fast in the air.

The angle of glide was bad for the flat-gliding-angle condition, but he thought his entries could have got through. For an autogiro with an empty weight of between 1,000 and 1,500 lbs. the speed range should be from 25 to 112 m.p.h. and the rate of climb 1,000 feet/min. at an angle of 25 degrees.

The resistance due to profile drag was less for the autogiro as one must consider the actual area of blades and not the disc area. He was not afraid of wing flutter because the conditions, owing to the movement of the blades, were constantly changing and also because of the flexibility of the blades.

Referring to the question of faith, Señor de la Cierva said that faith was a thing that could not be discussed. As for the question of parachute efficiency, there was enough experimental evidence to justify his figures. Costanzi using a rotor model with 18 blades in 1909 obtained a coefficient of 1.2 and Munk much more recently had obtained a greater figure. The speed of the autogiro in vertical descent was slightly greater than the vertical component in a normal glide.

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Some Records won by the Salmson 40-50 h.p.

CONCOURS DE LA PRUSSE ORIENTALE, 1929.

Won by a KLEMM machine fitted with a 40 h.p. Salmson.

BELGIAN INTERNATIONAL CONCOURS (Touring Machines), SEPT. 29th, 1929.

Won by a KLEMM machine fitted with a 40 h.p. Salmson.

WORLD'S HEIGHT RECORD, 19th SEPTEMBER.

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THE LIGHT AEROPLANE
AND THE FLYING CLUBS.

TO THE WINTER SPORTS BY AIR.

The following letter, from Sq. Ldr. H. M. Probyn, D.S.O., R.A.F., who has used his Westland Widgeon monoplane for touring all over Europe at odd times of the year, will be found of great interest to private owners:—

Sir,—The following information may interest your readers as I found difficulty in obtaining it myself.

My wife and I were anxious to get Winter Sports at reasonable cost and without crossing two frontiers. We decided to go to Chamonix, hoping to find an aerodrome fit to land on with wheels near the town. As we could not get any information about the landing grounds, or the weather, before crossing the mountains to Chamonix (owing to a storm having broken the telegraph wires), we left the machine at Ambérieu, 80 miles short of our destination, and went on by train. This journey took eight hours with three changes.

On arrival, we discovered a famous French soaring flight pilot, M. Thoret, who has his aerodrome at Le Fayet, 15 miles west of Chamonix, on the North side of the railway, and on the East bank of the river Arne, at a height of 1,500 feet.

The Potez Company has two aircraft here, used for joy-riding amongst the mountains, piloted by M. Thoret. Wheels are used from this aerodrome all the year round. Pilots should look round carefully before landing as the aerodrome marking-boards are several feet high. The aerodrome is about 600 yards long, and is narrow (300 yards) in one place. Look out for high-tension wires.

There is a landing ground at Chamonix, which in Winter, is likely to be covered in snow. It can only be landed on in two directions, and is surrounded by trees. There is the frame-work of a hangar.

M. Thoret very kindly gave me much information with reference to the air currents amongst the mountains, and I enjoyed a flight with him in a light Potez side-by-side high-wing two-seater. This machine, with a 60 h.p. Salmson engine, costs £510 in France and struck me as being strongly built, sociable, and very good value for money. I found it rather blind after my own machine.

I later flew up my own machine from Ambérieu, and managed to reach the level of the top of Mont Blanc, approximately 15,800 feet, despite my altitude control being locked in the closed position. After a time at this height, my ailerons began to catch, presumably due to the grease freezing on the hinges. I used the stick vigorously to counteract this.

I would advise pilots to obtain information of weather and state of aerodromes before flying into the mountain area. A good look-out must be kept for high-tension wires, and *téléferique* cables, the pylons for the latter are often far apart, and there is nothing on the cable to distinguish it.

We found Chamonix delightful and the resort of many French pilots, who go there regularly for Winter sports. It is less expensive than the Swiss resorts.

One can obtain considerable assistance in climbing if one uses the information gained from watching the snow blow from the mountain tops.

Much depends upon the shape of the peak. I think one gets a much worse down-wash from the reverse side of a smooth domed hill, such as one meets in the Cheviots, than from steep broken rocks. [A smooth dome or ridge is approximately a streamline form and carries a steady down-current, whereas broken peaks are stalled, and the air burbles behind them.—ED.]

One can only learn something of air currents from experience, as such factors as wind-strength, temperature, clouds, and nature of earth surface, vary each minute.

Gliding will no doubt teach us more about air-currents than flying will, and this knowledge would be a great help to pilots, who cannot afford to ignore air-currents, particularly when flying low-powered, over-loaded or light aircraft.

(Signed) H. M. PROBYN.

THE LIGHT AEROPLANE SPEED RECORD.

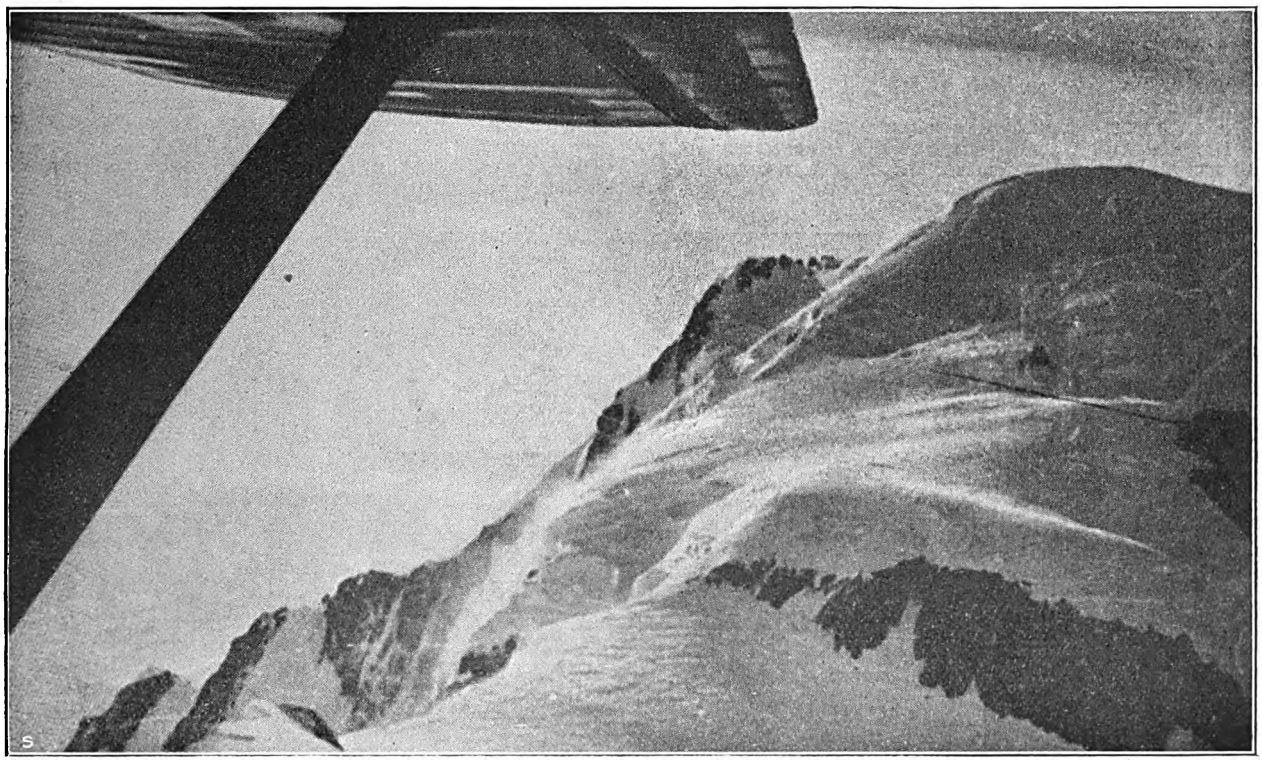
In THE AEROPLANE for Jan. 8 it was reported that Mr. W. G. Moore, flying an Inland Sport monoplane (110 h.p. Warner Scarab engine), made an average speed of 123.17 m.p.h. over an officially observed 100 km. course in the U.S.A., and that this was claimed to be a new World's Speed Record for light aircraft weighing less than 400 kgs. (880 lbs.).

As Mr. Moore carried the equivalent weight of a passenger as ballast this performance cannot be recognised as a World's Record. The F.A.I. regulations definitely state that in this particular category—two-seat aircraft weighing less than 400 kgs.—a passenger must be carried.

The World's Record still stands to the credit of Mr. Alan Butler, who with Mrs. Butler as passenger made an average speed of 119.7 m.p.h. in a D.H. Gipsy-Moth on December 7, 1928.

MR. CHICHESTER ARRIVES HOME.

On Feb. 11 Mr. Chichester reached Wellington, New Zealand, by steamer from Sydney. He has thus completed the journey he set out to do. Mr. Chichester always intended to cross from Australia to New Zealand by water.



ABOVE THE SNOW-LINE.—The top of Mont Blanc, the highest peak in Europe, taken from Sq. Ldr. Probyn's Widgeon at a height of 15,800 feet.

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This latest machine, which will be christened *The Foxhound,* will be put at the disposal of members who wish to use it for special purposes.

The Club's shed is being extended on either side to accommodate the two additional machines, and Mr. Everard is generously bearing the cost.

Mr. Lindsay Everard is having a private flying ground built on land practically adjoining his house at Ratcliffe. The completed area will be about 45 acres and the work is being done by Mr. J. Hunter, who is probably the greatest expert on aerodrome construction in this country. This aerodrome will be available for instruction by the Club.

Through the kindness of Major Guy Paget arrangements have been made for the use by the Club of a very large field in the grounds of Sulby Hall as a temporary landing ground. This will form one more landing ground in Mr. Everard's scheme to provide a ring of such grounds all round the country. With Leicester as the centre, the Club now has landing grounds at Desford, its headquarters, on the West, Ratcliffe on the North, Sulby on the South, and arrangements are nearly complete for another ground on the Eastern side.

Flg. Off. S Martin Thomas, R.A.F.O., has been appointed Instructor to the Club, in place of Flt. Lt. R. L. Bateman, who has resigned to take up another post.

The membership of the Club now stands at 255, of which 56 are pilot members and 185 are observer members.

THE BRISTOL AND WESSEX AEROPLANE CLUB.

The Bristol and Wessex Aeroplane Club has appointed Flt. Lt. L. P. Winters, late R.A.F., to be manager of the Club, and he has already taken up his duties. As the Club has been asked to manage the new Municipal aerodrome, Mr. Winters will also have this responsibility.

After eight years' service in the Indian Army Mr. Winters joined the R.A.F. and was posted to No. 4 F.T.S., Egypt, in January, 1924, for instruction. In 1925 he was lent to the High Commissioner for 'Iraq and for eighteen months he was acting British Consul at Baghdad and Under-Secretary to the High Commissioner. In September, 1927. he was appointed to No. 7 (Bomber) Squadron, Worthy Down, and in July, 1929, was posted to No. 501 (Bomber) Squadron (Special Reserve) at Filton, of which for a period he was acting Commanding Officer.

The Bristol Club has now gone into residence on the new Municipal aerodrome at Whitchurch, and the Club's address henceforth will be: The Bristol Air Port, Whitchurch, near Bristol. Telephone number: Bristol 4400.

The Club has been asked by the Guild of Air Pilots and Navigators to arrange for a class in Air Navigation for the Second Class Air Navigation Licence. If a minimum of 20 students can be found, the Club will provide accommodation and the Guild will try to arrange for a lecturer to visit Bristol one or two nights a week and for the Air Ministry to hold the examination there. The course will be spread over three months and the fee will be £5 5s., plus a deposit of £1 for the use of tables and instruments.

THE LIVERPOOL AND DISTRICT AERO CLUB.

On Jan. 11 the fourth Quarterly Forced Landing Competition for the Leeming Trophy was held at Hooton in cold but fine weather.

Out of the fifteen entrants only three succeeded in landing within the boundaries of the landing area. Some of the later competitors complained of the difficulty of landing into the sun, which was troublesome towards the end of the afternoon, and this may have accounted for some failures.

In the opinion of Sq. Ldr. Whistler, D.S.O., D.F.C., R.A.F., who acted as judge, the main fault was that of gathering speed on coming out of gliding turns. In his opinion the standard of skill shown was definitely lower than in previous meetings, and this showed lack of practice.

The Trophy was won by Mr. Ellis, the consolation prize was awarded to Major Leete. Mr. Williamson was third.

THE AERO CLUB OF EAST AFRICA.

On Jan. 5, the Aero Club of East Africa held a flying meeting at Nairobi on the occasion of the baptising of the Club's first machine, a Gipsy-Moth, which has been presented to the Club by Lord Wakefield. The ceremony was performed by the Hon. Lady Grigg, the wife of the Governor of Kenya Colony. The machine, which is of the latest type with metal fuselage and slots, was named *Acea,* a name formed by the initials of the Aero Club of East Africa.

Following the ceremony, *Acea* was flown on her maiden trip by Lord Carbery, the pioneer of Civil Aviation in East Africa.

Later in the afternoon a number of flying events were staged before a huge and enthusiastic crowd. These included aerobatics, formation flying by five Moths, a balloon-bursting competition and a height-judging contest. The machines taking part were six Moths, including three belonging to the Hon. F. E. Guest's expedition, two privately-owned Moths, as well as *Acea,* and an Avro Five, *Knight of the Grail,* belonging to Wilson Airways, Ltd.

For two hours the crowd watched flying such as had never been seen before in East Africa and from a propaganda point of view the meeting was a great success.

GLIDING.

The British Gliding Association.

The British Gliding Association has changed its address, which is now at 44a, Dover Street, W.1.

Mr. Howard Flanders wishes to apologise for the delay in answering correspondence. He hopes that now he has proper facilities all outstanding letters will be answered.

Ten affiliated clubs are now in process of formation. These are Cardiff, Dirt Track Riders, Evesham, Gloucester, Halton, Harrogate, Kent, London, Manchester, and Newcastle. This enthusiasm seems likely to culminate in inter-club competitions at the end of this summer.

There is some spur towards this as Lord Wakefield of Hythe is presenting a Cup to the Association. The conditions of competition for this cup will be announced later.

One can only stand amazed at Lord Wakefield's generosity and congratulate the B.G.A. upon their good fortune in having a benefactor who not only contributes to their funds but also presents trophies.

Another Gliding Club.

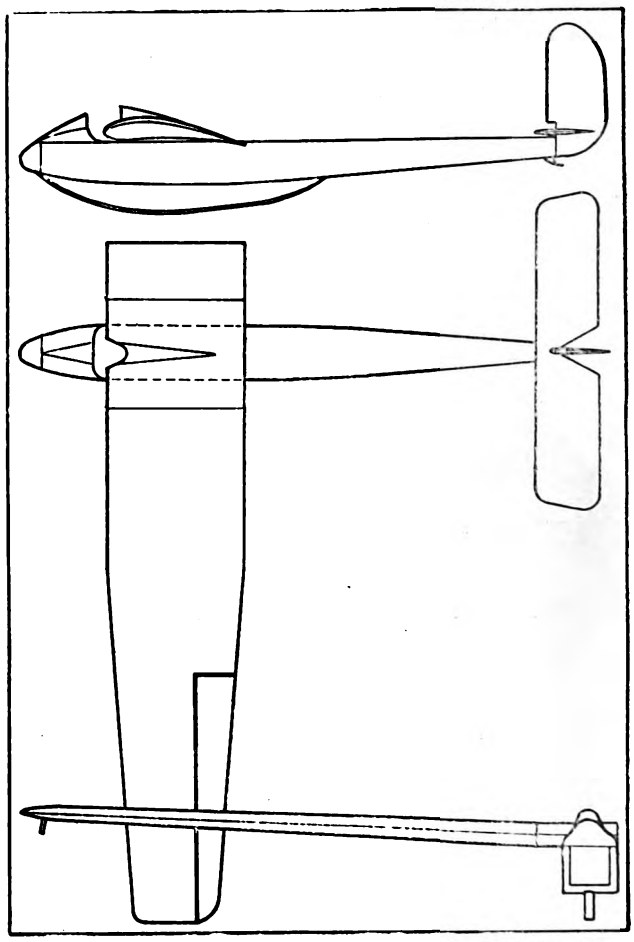
Mr. H. C. Wright has been working enthusiastically for some time to form a Gliding Club in the Evesham district.

A club is being formed and soon a meeting of founder and prospective members will be called to inaugurate the North Cotswold Gliding Club. People who live round about Evesham and are interested should write to Mr. H. C. Wright, 45, Merstow Green, Evesham, Worces.

The Needham Albatross.

The Albatross sailplane has been designed by Mr. C. N. Latimer Needham, Honorary Secretary to the Halton Aero Club and a member of the Technical Committee of the British Gliding Association.

A certain number of these machines are being put into production in the near future. People who are interested should write to this office for further information.



DIMENSIONS.—Span 42 ft. (12.8 m.), Chord 5 ft. (1.52 m.), Length 20 ft. 8 in. (6.30 m.), Wing area 180 sq. ft. (16.7 sq. m.).

WEIGHTS AND LOADINGS.—(Estimated) Weight empty 180 lbs. (81.6 kgs.), Weight loaded 350 lbs. (159 kgs.), Wing loading 2 lbs./sq. ft. (9.76 kgs./sq. m.).

PERFORMANCE.—(Estimated) Minimum forward speed 20 m.p.hr. (32.2 km.hr.), Gliding angle 1.15; Sinking speed 2.93 ft./sec. (.89 m./sec.).

To Glider Manufacturers.

A large number of inquiries are received by this office, in which people ask as to where they can obtain gliders and sailplanes. Will people or concerns who are manufacturing these types of aircraft, please send detailed information to this office, where it will be filed.

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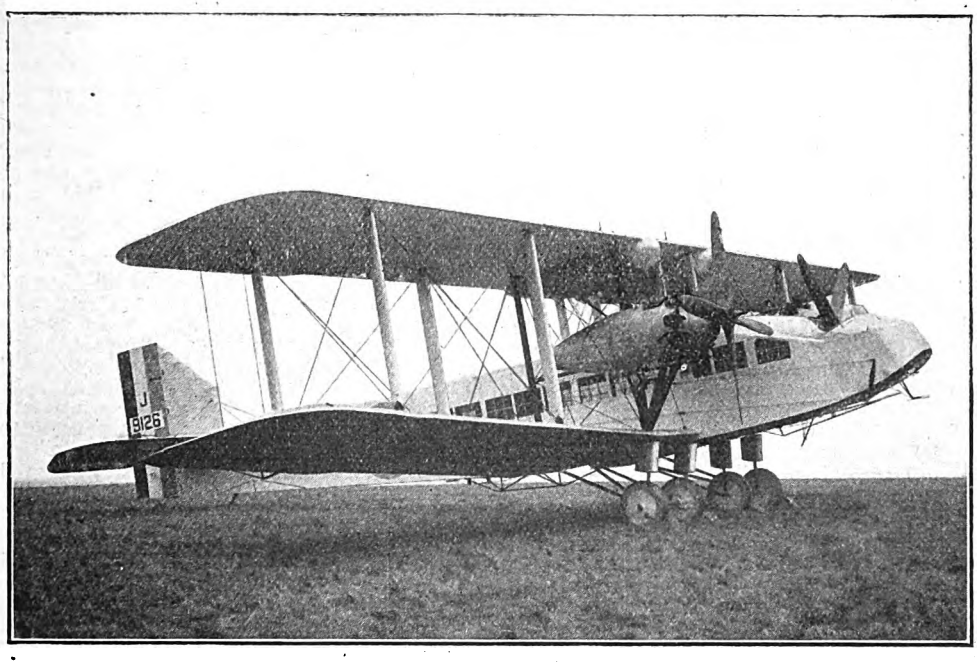
"TITANINE" DOPE

AND

THE HANDLEY PAGE "CLIVE."



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of 70 to 75 m.p.h. has been treated with the famous 'Cellon' dope, which has shown itself quite wet and weather-proof, as well as impervious to castor oil and petrol."

By the time the War 1914-18 started "Cellon" was a "hangar-word" and its fame had travelled far. The enormous demand for the material made a big expansion necessary. People who go to Richmond in the Summer week-ends are familiar with the big works at the bottom of Richmond Hill where thousands of gallons were turned out during the War.

After the signing of the Armistice Mr. Wallace Barr realised that dope had other applications than the tautening of aeroplane wings and the fabric covering of dirigibles. A hard and coloured skin impervious to weather and atmospheric conditions, a skin that could be polished and cleaned, had obviously great scope in coach-building work such as for the finishing of car bodies.

Cellulose paint, as such material is generally known, is in evidence everywhere to-day and is used for many domestic purposes, as for interior decoration and for the polished finish of wooden furniture. The particular brand of cellulose paint marketed by this company is known by the trade name of "Cerric." The steady and growing demand for "Cerric" lacquers, coupled with the increasing market for aircraft dope, has made the building of new Works at Kingston a necessity.

Most people know that paint is made of some material like the familiar red lead, or lead oxide, mixed with linseed oil. Another familiar mixture is zinc oxide and linseed oil. These form the bases of most paints, the colours being obtained by the introduction of a suitable colouring matter.

When paint is applied the oil slowly oxidises and the mixture hardens. That is satisfactory. But not only the outer skin oxidises, this process goes on all the way through and when complete or nearly so, makes the application of further coats necessary as the paint has lost its adhesive properties.

Now cellulose dopes or lacquers, because of their different natures, behave in another fashion. They are made by dissolving cellulose nitrate or cellulose acetate in suitable solvents with various auxiliary components, some of which have the effect of making the resultant film flexible.

Once applied the solvent evaporates, and a hard film of cellulose remains, and no further change occurs. One saw at the Works one particular car which had been treated with cellulose paint when the method was first developed. The surface is still in first class condition and only where beadings and similar parts have worked loose on the main structure has the finish cracked. In such circumstances a finish could do nothing else.

One of the outstanding features of modern industry as a whole is the tendency to make and keep things cleaner. The interior of a modern turbo-electric generating station is amazingly spick and span. The same thing strikes the visitor to the stokehold of a modern oil-fired liner. The visitor has had visions of grimy stokers shovelling coal and finds instead an enamelled palace.

The new Works of Cellon Ltd. are like this. Perhaps enraged mixers and grinders of dope will surge forth to destroy one, on the grounds that theirs is not a dirty business like stoking. Of course one was not making a direct comparison but merely using a spot of metaphor.

Anyway the outside impression of the new office building and its layout along the Richmond-Kingston Road opposite the Leyland Works is very attractive.

The whole of the interior of the offices is a decorative example of the practical value of cellulose finishes in general and "Cerric" in particular. The furniture in various offices demonstrates the advantages of appearance and durability which cellulose finishes confer.

The gold-painted radiators in Mr. Barr's room were painted in that fashion for experiment and not for decoration. The material used on the Gloster VI was first tried out by this method. This still remains as a permanent record of the firm's part in the great contest. As a matter of fact they doped the Supermarine S.6 as well.

The Works proper are, or certainly were to the writer, staggeringly laid out. Behind the offices is a lawn with what looks like a summer-house in one corner. As a matter of fact it was not a summer-house but an electric substation. All the roads and paths are asphalted, which gives the place a very neat and tidy appearance.

All the shops are quite decorative in exterior appearance and have the most magnificent oak doors. One was told in answer to queries about such extravagance that it does not cost much more and it lasts much longer.

The Works are laid out to simplify production. The solvents and their diluants are poured in tanks below the solvent store. An intricate system of pipes runs from here to the mixing shops. In the mixing shops are a number of 500-gallon tanks with mechanical stirring devices driven from overhead shafting.

From a control point in each mixing shop the foreman can run into a calibrated cone a measured quantity of solvent or diluent from the Solvent Store. This transfer is effected by a system of pipes and compressed air. After measurement the liquid is run by gravity to any of the mixing tanks.

The cellulose and the colouring pigments or other materials are fed in accurate quantities through removable panels at the top of the mixing tanks. The whole mixture is stirred for something like forty-eight hours and when the mixture has been tested and found correct by one of the laboratory staff, it is run to a measuring drum. This drum measures the exact quantity needed to fill the familiar cans.

A very important feature of dope manufacture is the adequate ventilation of the shops and especially the mixing shops. Cellon Ltd. have evolved a very neat scheme. The walls of their shops are double. On one side fresh air is drawn into the bottom of this space and heated to the proper temperature.

This air is admitted to the shop through apertures in the top of the double wall. As the air cools and becomes contaminated it falls and is withdrawn through ventilators low down in the hollow walls on the other side. This air is withdrawn by electrically-driven fans.

Before the pigments and colouring matter can be added to the mixing tanks the material has to be in a very finely-divided state. This is effected by grinding in roll mills or machines very like those for winding candy.

Overhead runways have been constructed in, and between, each shop. Materials can thus be transported with a minimum of labour anywhere about the Works.

The compressed-air system is carefully laid out and is automatic. The plant is electrically driven and incorporates a special control so that the tanks are maintained at 80 lbs. pressure. When the pressure falls the compressor starts and works until the tanks are filled again. Controls are placed in various places so that the whole system can be put out of action in any emergency.

An important feature of the Works is the laboratory where all the raw material is tested, and passed or rejected. In this laboratory routine tests are run on material in production and tests are made on the completed material to see that it has given the requisite tautness.

This seems the proper place to say that the company has produced two polishes especially adapted for cellulose finishes. "Cellabrase" is an abrasive polish for use on rough surfaces, and "Cerrax" is a composition for giving a high polish and keeping cellulose lacquers in the best condition.

On Jan. 1 of this year Cellon Ltd. acquired two new Directors, both of whom have been working with the firm for many years. Mr. W. J. Shilcock, who thus becomes a Director, has been connected with the Sales Organisation of Cellon Ltd. since 1913. The other new Director is Mr. H. Lazell, who has been Chief Chemist and Works Manager since 1916.—T. J.

THE STAG LANE RUMBLE CLUB.

With regard to the formation of the Stag Lane Rumble Club, details of which appeared in THE AEROPLANE for Feb. 5, it should be understood that this has been formed by the pilots of the De Havilland Aircraft Co., Ltd., and not by the company itself.

One regrets that this was not made clear at the time and one's apologies are extended to the De Havilland Aircraft Co. for the misrepresentation.

MORE SAFEGUARDING.

The following letter has been published in *The Morning Post* and is reproduced with acknowledgments:

Sir,—As it appears we are to look upon the B.B.C. as the fount of English undefiled, may I protest through your columns against the Corporation's use of the word "airplane" for "aeroplane." The word is a disgusting bilingualism, as much a vulgar hybrid as "icedrome" or "picturedrome," and has reached this country from across the Atlantic.

So many words of U.S. manufacture are creeping into our daily conversation through the "talkies" that it is imperative for the B.B.C., if it is to supply our criterion of real English as she should be spoke, to eschew all imported words whose use is not justified by necessity.

SIDNEY ROGERSON.

39, St. James's Street, London, S.W.1.

YANKEE (FLAP)-DOODLE.

Not long ago two young Americans were married in an aeroplane. Not content with that, they thereafter walked out of the machine and descended to the ground by parachute from a height of 2,000 feet. The "best man" dropped after them. Eleven guests remained in the aircraft to return to earth by normal methods.

On the same day two masked men gagged a night watchman and stole an aeroplane from a Kansas City aerodrome.

Several marriages in the air have already been reported from the United States, a young woman has committed suicide from an aeroplane, and a mother has gone into the air to be delivered of a child.

All these little incidents seem to confirm the general opinion that Aviation is fast becoming an accepted fact in normal American life.

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COMMERCIAL AERONAUTICS.

THE INDIAN AIR MAIL.

Imperial Airways Ltd. have published a temporary time-table for the England-India air mail route by way of Central Europe and Athens which replaces the original route which went by way of Basle, Genoa and the west coast of Italy.

As the Winter conditions on certain sections of the Central European route still remain to be studied, only the London—Cologne stage is flown, the stage from Cologne to Athens being covered by the Orient Express. Alternatively the Simplon-Orient route by way of Paris may be used as far as Athens, or the first part of the journey may be made by steamer to Egypt to connect with the air departure from Cairo.

Eventually, it is hoped, that the air route will be by way of Cologne, Nuremberg, Vienna, Budapest, Belgrade, Uskub, Salonika, Athens, which will give an accelerated through service.

Imperial Airways will make every arrangement for the convenience of intending passengers on the above temporary route. Through fares to Hyderabad, Jodhpur and Delhi on the new extension from Karachi are now available on application.

According to *The Times*, a *questionnaire* was recently sent out to the banks and leading business houses in London by the Civil Aviation Section of the London Chamber of Commerce to inquire about their experience of the air mail to India.

The chief suggestion in the replies was for the "speeding up" of the delivery of the mail after reaching Karachi. It is generally complained that there is considerable delay in the delivery of letters at the various terminal points, so that the advantage in the saving of time by the air mail is partly lost. This matter has been brought to the notice of the Secretary for India by the London Chamber of Commerce, and it is understood that their representations have been forwarded for the consideration of the Indian Government.

The following moderate and constructive commentary on the England—India air-mail route was published as a leader in *The Statesman* of Calcutta:

On January 2 letters bearing three-halfpenny stamps were posted in London for the ordinary land-and-sea mail service to India, and after travelling for the greater part of the journey at (we suppose) between 20 and 25 miles an hour were delivered in Calcutta on January 19. On January 3 letters bearing not less than 7½d. each in stamps were despatched in London for the air mail service in order that they might be carried to India at not less than 85 miles an hour: some of them were delivered in Calcutta on January 19, others on January 20. On that last date Reuter's Agency in London learned that "Imperial Airways is speeding up the London—India air mail service. It is hoped to save a day in the London—Egypt section, reaching Athens from London via Central Europe in two days, and Egypt from Athens via Crete by flying-boat in one day. Further saving is expected by night flying in the Egypt—India section." Perhaps the coincidence of the two events was not the happy accident tempting to irony that it seems to be. We maintain the hope that it means simply that the Imperial Airways authorities are going to make a gallant effort to placate their slightly irritated patrons and customers.

Nothing more drastic is needed at present to remove that annoyance than a return to the air mail's nominally normal time-table. For some months the mail leaving Croydon or Karachi regularly reached the other end of the route about seven-and-a-half days after it had started. This was a great boon: it meant the saving of nearly a fortnight in the exchange of communications between correspondents in England and India. Then came the first of a series of deeply regrettable accidents to air liners which drew everyone's sympathy as well for Imperial Airways as for the other victims of their misfortune. Since then, despite the firm's no doubt sincere wish to maintain a reliable service, unpunctuality has become both normal and various, so that it is left to the layman each week to hazard a guess how many days late the mail will arrive. There has not, indeed, been any appreciable decrease in the weight of the mail carried, but obviously the businessman and the "private individual" cannot be expected indefinitely to continue the payment of the heavy air mail postage dues in doubt as to whether it will effect the saving of a day or two in transit. They know that the development of aviation is one of the remarkable phenomena of the last fifteen years: they remember very clearly the days when they scoffed at the optimists who predicted Empire air services: they are properly humble and ready to admit that the optimists have rewarded evil with great good. But they know also that owing to that development of aviation airmen have been able during the last few years to achieve long and rapid flights much more remarkable than an eight days' journey from England to India. A Duchess, for instance, has flown the double trio from Croydon to Karachi and back in a week. When, they ask, will the lessons of these achievements—useless as they are except as lessons—be learned and put to profitable use by the air mail authorities?

The latest news from Imperial Airways suggests that they are beginning to do this, and the grumblers must encourage them. They hope soon to start night-flying in the Egypt—India section of the route. That means that they are ready, or ought to be ready, with the elaborate landing-ground arrangements that are required by pilots flying in darkness, so that a pilot arriving late at the penultimate station of a day's journey need no longer postpone the next take-off to the following day. For night journeys in Europe there is the alternative possibility of carrying the mails by railway from one aeroplane station to another—a plan which we believe has not been given as much thought as it may merit. Concurrent perhaps with this development there should be an increase of the number of reserve aeroplanes available along the route: there have been occasions when an aeroplane found out of order at one station has had to be replaced by one sent from another and possibly far-away station, which results in the delay of the mails and an appearance of curable inefficiency. The whole service, indeed, needs to be tightened up, and its loose threads of haphazard chance unravelled and curtailed. If to this end the authorities will adopt a bold and business-like policy alike in financial and technical administration, we think that they will be well rewarded.

Imperial Airways have issued a statement which shows a steady increase in the outward mail, but a considerable decrease in the homeward mail, from Karachi.

The reason suggested by Imperial Airways for the lack of use of the air mail is the heavy surcharge. The Indian Post Office receives 1¾d. minimum surcharge more than the British Post Office. If these heavy charges were reduced the new extension of the service to Bombay should receive more than enough support to make it successful.

As THE AEROPLANE is always pointing out, mails should travel by the swiftest method possible at a minimum figure. As aircraft have proved as safe as trains, and much faster, mails should automatically travel by air.

INDIAN CIVIL AVIATION.

The Standing Finance Committee of the Indian Legislative Assembly has been devoting considerable time to the question of extending the present England-India air mail route across India.

It sanctioned a scheme whereby the Director of Civil Aviation will provide a mail service with three-engined machines from Delhi to Calcutta in the autumn, which will later be extended to Rangoon. Mails only will be carried at first.

One Indian representative declared that it was premature to start a State air service until Indians were forthcoming to man it. He was anxious to provide a training school for Indian youths, and wanted an assurance that the service would not become a foreign monopoly.

A representative of the Civil Aviation Department explained that the aircraft on the service would be flown by British pilots but would carry an Indian assistant pilot who in time would become a first pilot. All British pilots had been engaged on only one year's contract. Eight Indians were under training in England, and it was hoped that after the end of the first half-year's operation of the service all machines would be flown by Indian pilots. Indians were also being trained as mechanics and ground engineers.

The Government were determined not to allow any non-Indian monopoly in manning the air service. The Chairman pointed out that the State air service has been decided upon merely to protect Indian interests, as it would have been impossible to secure these with private companies.—

C. F. D.

AN EXAMINATION FOR AIR NAVIGATORS.

An examination for 2nd Class Air Navigators' Licences will be held at the Air Ministry, Gwydyr House, Whitehall, and concurrently at the office of the Air Ministry Representative, Heliopolis Aerodrome, Cairo, on March 24, 25, and 26, 1930.

Application forms, the syllabus, and conditions of examination may be obtained on application to the Secretary, Air Ministry (C.A. 2), Gwydyr House, Whitehall, London, S.W.1, or to the Air Ministry Representative, Cairo-Karachi Service, Heliopolis Aerodrome, Cairo, Egypt.

Formal applications to sit at this examination must be made on Form C.A.2.c. and, together with the prescribed fees, must be received at one of the above addresses not later than March 10, 1930. Applications to sit in London should be sent to the Air Ministry, and applications to sit in Heliopolis should be sent to Cairo.

Before a licence can be issued, candidates will have to pass the prescribed medical examination. In the case of candidates sitting in London, arrangements can be made for their special medical examination at the Central Medical Board to take place on March 26, 1930, if early application is made to be examined on that day. Otherwise, special arrangements will be made.

All prospective candidates should note that the prescribed fee for the Technical examination will be two guineas, and that the additional subject "Visual Signalling" will be included in the forthcoming examination.

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THE ACCIDENT AT MARDEN.

The inquest on the bodies of Mr. and Mrs. Albert Allen Hodges, who were killed in the accident to the French Air Union Goliath at Marden on Feb. 10, was opened at Pagehurst Farm, Marden, on Feb. 12.

After evidence of identification had been taken and various witnesses had given their evidence, the inquest was adjourned until Mar. 13. By this date the pilot and mechanics were likely to be sufficiently recovered to attend.

THE EXTENSION TO AUSTRALIA.

According to the Canberra correspondent of *The Times* on Feb. 14, Mr. Scullin, the Commonwealth Prime Minister, said that, though the British Government seemed to have assumed that the Commonwealth was ready to subsidise the Singapore—Australia section of the proposed air service to Australia, such an undertaking had not been given. It was not yet decided whether it would be preferable to have the service under the control of Imperial Airways or to form an Australian subsidiary company.

BATAVIA—SINGAPORE.

The Times correspondent at Singapore says that the K.N.I.L.M. experimental flight from Batavia to Singapore, as a preliminary to the establishment of a regular service next month, was most successful. The aeroplane arrived at Singapore on Feb. 10, having taken only seven hours for the trip in spite of adverse winds, which were estimated as adding at least 90 minutes to the flying time.

The machine carried eight passengers, one of whom was Sir Josiah Crosby, Consul-General at Batavia, who is on his way home. Refuelling was done at Palambang. The return journey began at 06.30 hrs. on Feb. 11. The machine carried the first air mail from Singapore.

TRANSPORT AVIATION.

[*Transport Aviation.* By Archibald Black. Second Edition completed, rewritten, enlarged and reset. 341 pages, profusely illustrated. The Simmons Boardman Publishing Co., New York, and from THE AEROPLANE Book Department, Cannon House, Pilgrim Street, E.C.4.]

Dipping into this volume, the average English reader will be uneasily aware that the icy chill of an inferiority complex is creeping down his spine, for it is the American Eagle speaking about this Aviation business.

He will obtain an impression that we, in Europe, do not know a darned thing, and that such things as wireless telephony, the necessity for meteorological reports, comfortable cabins and some decent system of running air lines in general, were all invented or first thought of a year or so ago in the U.S.A.

To do the book justice, it does not say so, and in several places, European ideas are freely discussed and given full consideration and credit. No, the book does not say so, it is just a feeling the reader gets

One of the first things the Author proudly tells the World is that Civil Aviation began in America some months prior to its establishment in Europe and that when started, it "Quickly became the World's standard, attaining a perfection far beyond that approached by any other service in the World."

When he goes on to say that this was the Government-run Mail Service between New York and Washington which we believe was run regardless of expense, regardless of crashed machines and regardless of responsibility for passengers (because there were none) by military pilots under definite orders to get through at all costs, we reply that with these advantages, anybody could do likewise, and that this was not what we call Civil Aviation, and cannot be compared to our early passenger-carrying Civil Aviation which incidentally was quite unsubsidised.

Much of the book deals wisely and well with traffic and other problems purely American, which do not worry our differently organised, subsidised Air Companies over here, but there is an excellent chapter on Air Line advertising which European publicity people certainly ought to study.

Incidentally, Pan-American Airways have some amusing pamphlets for their Havana line, one of which begins "Chilblain time in New York, cocktail time in Havana." This is reproduced in this book.

Our old friend Capt. C. H. Biddlecombe (blushing modestly) is responsible for a well-written and erudite chapter on Airplane Engines which is a mine of really useful information.

In the Biographical appendix, he is delightfully referred to as having planned the Croydon Airdrome, the Paris route, etc. Now that wonderful "etc." shows us exactly what America thinks of European Aviation, and when Biddlecombe had fixed us up and fled to the States, leaving us floundering in a quagmire of unfinished etceteras, it accounts for our friends, the French, filling the air with plaintive, but alas, unanswered wails of "Allo Beedle-KOM! Allo BEEDLE-kom!

Anyhow, Beedlekom has our unbridled admiration because as faculty lecturer on Air Transportation to the University of New York, he, a Britisher, has achieved the amazing destiny of being able to talk and talk whilst rows and rows of New Yorkers sit dumb before him. As Mr. Squeers would say, "Here's richness!"

Chapter XIII on the Design of Passenger Airplanes was also written in collaboration with a well-known ex-European, A. H. G. Fokker, another old friend, and should interest those who think the last word in comfortable, fast and luxurious air liners is to be found on our European Air Lines.

The sector of this chapter dealing with interior decoration is especially noteworthy, as it stresses the psychological effect on travellers of a comfortable, finely-appointed cabin, a matter in which we believe some American Air Lines are well ahead of us.

"Transport Aviation" is really an extremely well-written book, which contains a very complete analysis of every possible branch of Aviation. It is profusely and interestingly illustrated and contains a mass of carefully compiled statistics.

It is an American book, however, about American Aviation, written for Americans, who will find it very fine reading, as will those English people, who are interested in the march of Aviation progress over there.

To the average Englishman, unless he has the same warped sense of humour as the present writer, it will make very little appeal.—SPRY.

IMPORTANT DATES.

Feb. 21.—Informal Dinner and Discussion on gliding at St. Ermin's Hotel at 19.30 hrs.
Feb. 21.—Boxing, R.A.F. v. Oxford University at Halton
Feb. 22.—Assoc. Football, R.A.F. v. Wycombe Wanderers at Wycombe.
Feb. 26.—Rugby Football, R.A.F. v. Oxford University at Halton.
Feb. 26.—Skill-at-Arms, R.A.F. College v. R.M.A. at Woolwich.
Feb. 26.—Hockey, R.A.F. v. R.N. and R.M. at Beckenham.
Feb. 27.—Mr. Rowledge's lecture before the Royal Aeronautical Society.
Mar. 5.—Wing Cdr. T. L. Leigh-Mallory's lecture before the Royal United Service Institute.
Mar. 6.—Major F. M. Green's and Mr. H. C. H. Townend's joint lecture before the Royal Aeronautical Society.
Mar. 8.—Rugby Football, R.A.F. v. Coventry at Coventry.
Mar. 8, 10.—International Gliding Congress at Darmstadt.
Mar. 10.—Herr Wronsky's lecture before the Royal Aeronautical Society.
Mar. 12.—Rugby Football, R.A.F. v. Civil Service at Halton.
Mar. 22.—Rugby Football, R.A.F. v. Army at Twickenham.
April 3.—M. M. P. Grimault's lecture before the Royal Aeronautical Society.
April 19.—Leicester Flying Meeting (Leicestershire Aero Club).
May 31.—Bristol Air Pageant (Bristol and Wessex Aeroplane Club). Official opening of Bristol Municipal Aerodrome.
June 9.—Northamptonshire Aero Club's meeting at Sywell Aerodrome.
June 10—15.—F.A.I. Conference, Paris.
June 21.—Annual Air Rallye at Haldon Aerodrome.
June 26.—Ipswich Air Pageant (Suffolk and Eastern Counties Aeroplane Club). Official opening of Ipswich Municipal Aerodrome.
June 27.—Annual Dinner, R.A.F. Dinner Club.
June 28.—Royal Air Force Display at Hendon.
July 5.—King's Cup Air Race (Royal Aero Club).
July 20—Aug. 7.—International Touring Competition.
July 26.—Norwich Flying Meeting (Norfolk and Norwich Aero Club).
Sept. 1—6.—Fifth International Congress on Air Navigation—The Hague.
Sept. 6—28.—International Aero Exhibition at Stockholm.
Sept. 20.—Liverpool Air Pageant (Liverpool and District Aero Club and Lancashire Aero Club).
Nov. 28—Dec. 14.—International Aero Exhibition at Paris.

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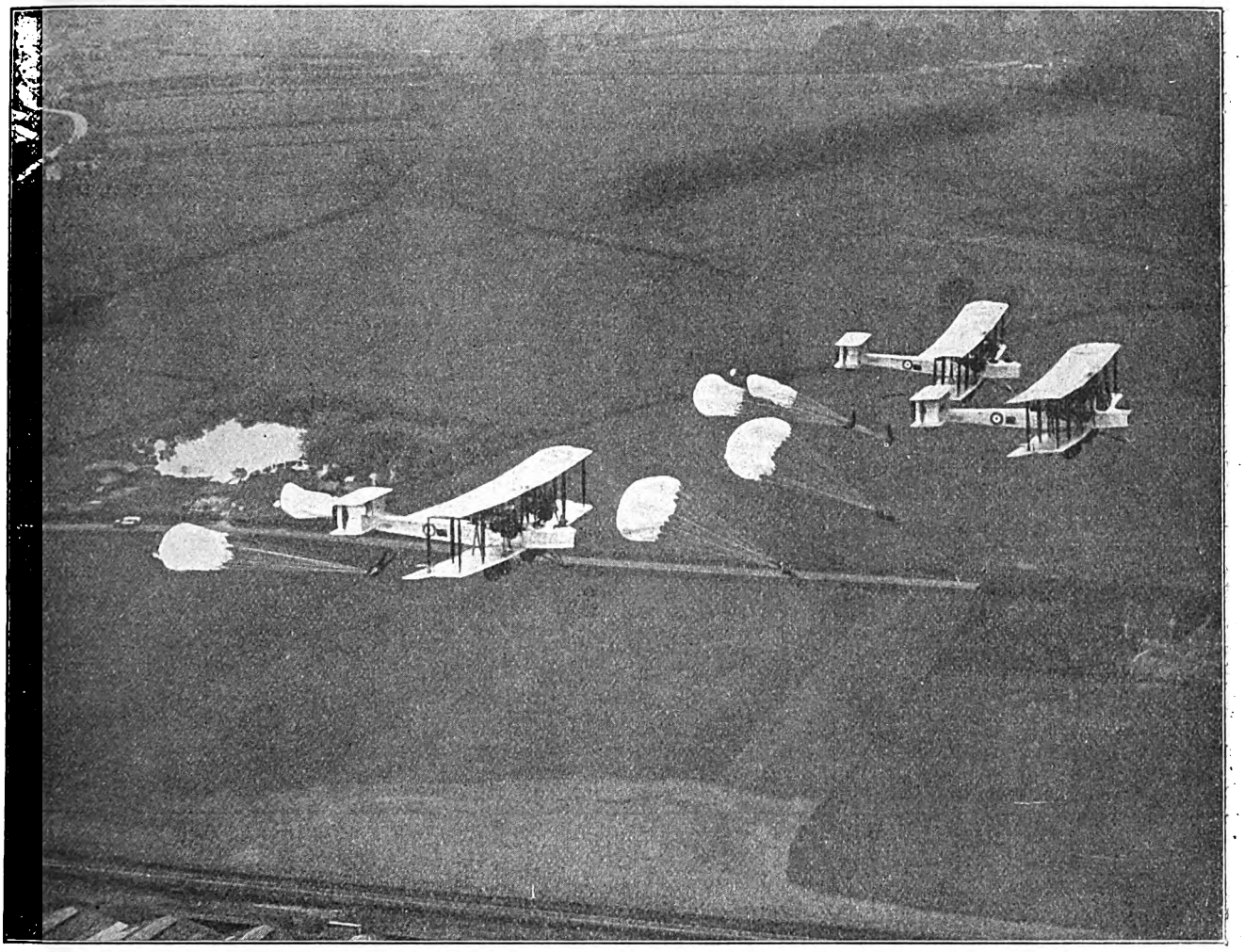

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CROYDON NOTES.

A little ray of genuinely warm sunshine shone upon Croydon the other day, when after a longish absence from Aviation circles, Mr. St. John Plevins returned to the fold. Mr. Plevins has left Anglo-American and joined John Hall and Co. (Bristol and London) Ltd., who are coming into the field with Aviation paints and dopes, and who very wisely put Mr. Plevins in charge of their Aviation Department.

Everybody was delighted to see Mr. Plevins back, and our old friend, Mr. Fred Hewlett, gambolled like a Canterbury lamb at the smell of mint sauce when he saw him.

Press and General Air Services is the title under which *The Daily Mail* aeroplane is now being operated. Mr. C. B. Wilson is in charge of operations, ably assisted by Mr. Matthews, who, when not flying, stands on aerodromes, looking upwards, thus acting as a neon beacon. The Company has an office at Croydon, and the idea is that *The Daily Mail* press work should be carried out first and foremost and after that, any other work may be done, even Press work, which, with Mr. Wilson's experience in this line, should be specialised in, one would think. At present a Desoutter monoplane and a Hermes Avian are available at any moment day or night.

Some alarm and despondency may have been caused by reference to "soothing symps" in last week's account of the festivities following the christening of Capt. Wilson's "Avis," and lest West End bar tenders should be unduly plagued by demands for this newest cocktail, one hastens to add that this was either Spry's error, or that of THE AEROPLANE Printer's Devil, but probably the former's! [It was.—ED.]

"Soothing syrups" were meant and these consisted of every sort of pleasing pre-prandial tipple of an alcoholic nature known to man. Now we have started, however, a beverage is being concocted which will be named "Soothing Symps" in perpetual memory of the occasion.

Spry wishes to appeal to the aviator who flew a giant triple-engined air liner comparatively low over his house on Wednesday, Feb. 12, at about 7.30 a.m., to "pleathe sthoppit" and to the other aeronaut who did likewise at about the same time the next day to kindly cut it out, as there is a tile loose already.

Having been betrayed by the Conservatives in the matter of Income Tax, thrown out of Labour meetings, and promised a country fit for him to live in by the Liberals, Spry has few political illusions left, but he thinks it is up to people from Croydon Aerodrome not to annoy local residents by thoughtless early morning test flying, lest peradventure the Local Urban District Council should rise up and "beat us with scorpions."—SPRY.

THE LONDON TERMINAL AERODROME.

ANALYSIS OF FIGURES FOR PAST WEEK.

Trips per Day.—Sunday, 8; Monday, 16; Tuesday, 16; Wednesday, 18; Thursday, 18; Friday, 12; Saturday, 19.

IMPERIAL AIRWAYS LTD.:
London—Egypt—India: London—Le Touquet—Paris—Basle—Zurich: London—Ostend—Brussels—Cologne and return: Machines 38, passengers 156, freight 13¼ tons. India Route: Inward, passengers 0, mail 607 lbs.; outward, passengers 0, mail 742 lbs.

AIR UNION:
Paris—London: Machines 31, passengers 80, freight 7½ tons.

K.L.M.:
Amsterdam—Rotterdam—London: Machines 12, passengers 23, freight 6 1-10 tons.

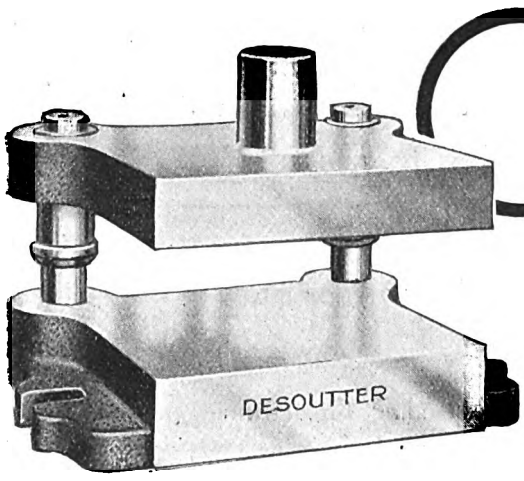
SABENA:
Brussels—London: Machines 12, passengers 15, freight 2 tons.

DEUTSCHE LUFT HANSA A.G.:
Amsterdam—London: Machines 9, passengers 15, freight 1¼ tons.

MISCELLANEOUS:
British machines 5, passengers 7.
Foreign machines 0, passengers 0.
Total number of trips by British machines, 43, carrying 163 passengers. Foreign machines, 64, carrying 133 passengers.

COMPARATIVE FIGURES.

Week ending Feb. 15:
Machines, 107; Passengers, 296; Crews, 277; Total personnel, 573.
Corresponding week, 1929:
Machines, 92; Passengers, 238; Crews, 175; Total personnel, 413.
Corresponding week, 1928:
Machines, 75; Passengers, 299; Crews, 144; Total personnel, 443.
Corresponding week, 1927:
Machines, 36; Passengers, 57; Crews, 59; Total personnel, 116.
Corresponding week, 1926:
Machines, 74; Passengers, 177; Crews, 91; Total personnel, 268.
Corresponding week, 1925:
Machines, 67; Passengers, 120; Crews, 84; Total personnel, 204.
Corresponding week, 1924:
Machines, 68; Passengers, 113; Crews, 113; Total personnel, 226.
Corresponding week, 1923:
Machines, 42; Passengers, 102; Crews, 76; Total personnel, 178.
Corresponding week, 1922:
Machines, 45; Passengers, 81; Crews, 74; Total personnel, 155.
Corresponding week, 1921:
Machines, 30; Passengers, 32; Crews, 38; Total personnel, 70.



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A PIONEER.

The other day one came across one of the pioneers of British Aviation of whom many old friends may be glad to have news. Frequenters of Hendon in the pre-War days will remember Signor G. Nardini as an expert pilot of Deperdussin monoplanes. Although he was a professional aviator he was in spirit very much the amateur sportsman, for he ran a motor business and one imagines spent most of his profits on flying. On the outbreak of War he went home to Italy and since then nothing has been heard of him in British Aviation.

One now learns that when Italy came into the War he joined the Italian Army Air Service and while flying on active service had a very bad crash. He landed in the top of a tree and was practically left for dead for twelve hours. After a long time in hospital, and hobbling about on crutches for about two years, he joined the Lancia Company and held a responsible position in the Lancia factory for a number of years.

Not long ago he came to England, and he is now established at 44, William Street, Hampstead Road, N.W. He has by no means lost his fondness for flying, and has of late been down to the Heston Air Park a good deal. Readers of this paper who happen to have Lancia cars will find that Mr. Nardini will give them first-class service.

AERODROME EQUIPMENT.

Brown Brothers Ltd. of Great Eastern Street, E.C., still continue to supply the aircraft manufacturers with their bolts and nuts and a thousand and one other accessories. A development of this side of the industry is the production of stainless steel bolts and kindred articles.

Another development of this firm is the adaptation of garage equipment for aerodrome use. Among this equipment is the Hardie car washer, which is being widely used on American aerodromes for undercarriage and fuselage cleaning.

The washer is electrically driven, and draws its water from the main supply, or from a barrel. There are two forms of discharge, a hard direct jet, and a mist spray, either of which is produced by a slight adjustment of the gun-nozzle. Other features of the washer are the self-lubricating system, and silent chain-drive.

Air compressors, engine cranes, and valve grinders are also included in the equipment.

NEW AIRCRAFT WOOD.

"Mallite" plywood is familiar to all aircraft users, and is to be found in nearly all parts of wooden aeroplanes. At the firm's works in Kingsland Road are stored huge quantities of this wood in thicknesses varying from 0.8 mm. to 19-ply of about 1½ ins. in width.

The Aeronautical and Panel Plywood Co., Ltd., are now developing an extraordinary light wood called Balsa, which should be of great value in aircraft construction. This wood, faced with aluminium, was used for the stair treads of R 101. It is also used for doors and table tops of commercial aircraft. Its remarkable lightness and great strength makes it readily adaptable for this sort of work.

The firm is now engaged in large shipbuilding and railway contracts.

LUBRICATION.

W. B. Dick and Co., Ltd. of 26, Grosvenor Gardens, S.W., have just published an interesting brochure entitled "Scientific Lubrication for every class of Machinery—Sky, Earth or Sea."

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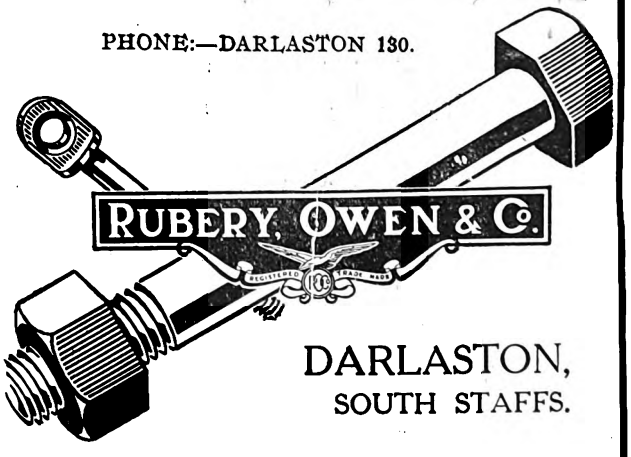

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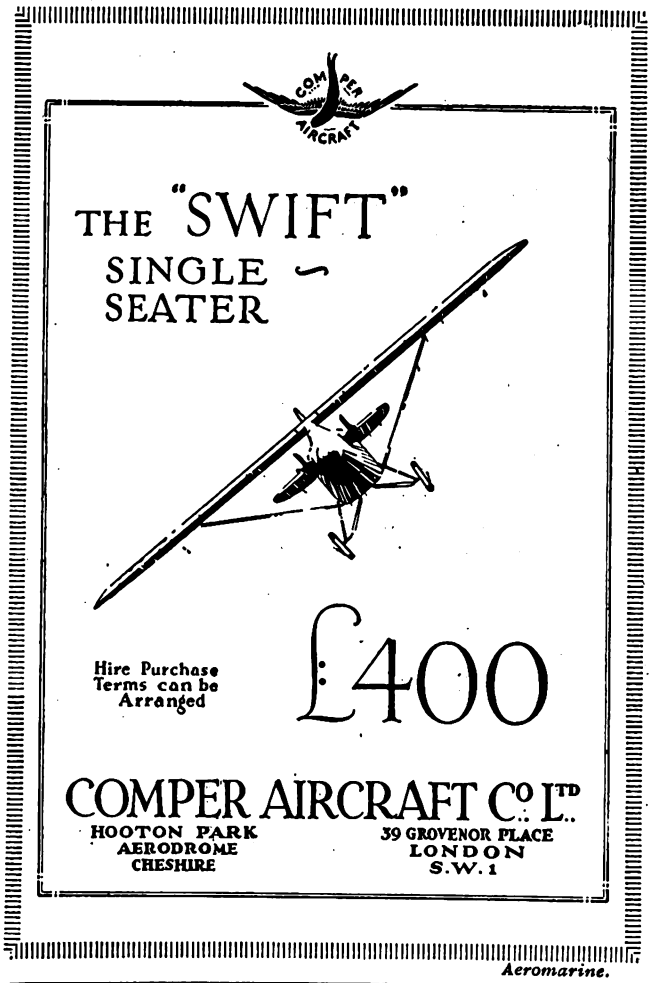

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of the title. It is interesting to note that, in addition to their existing products, the company has now produced a special aero-engine oil. As already mentioned in The Aeroplane this oil is now being subjected to practical test in the company's own Gipsy-Moth.

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PERSONAL NOTICES.

Births.

CLARKSON.—On Feb. 12, at 27, Welbeck Street, to Leslie (*née* Manning), wife of Christopher Clarkson, late R.A.F.—a son.

HALL.—On Feb. 2, at Halton, Bucks, to Sq. Ldr. and Mrs. P. A. Hall, R.A.F.—a son.

JONES.—On Feb. 6, in a nursing home at Cambridge, to Betty (*née* Hood), wife of Flt. Lt. R. O. Jones, R.A.F.—a daughter.

NELSON.—On Feb. 13, at 46, St. George's Road, S.W.1, to Poppy, wife of A. W. H. Nelson, Flg. Off., R.A.F.—a daughter.

SCOTT.—On Feb. 9, in Brisbane, to Kathleen, wife of C. W. A. Scott, late R.A.F.—a daughter.

Marriages.

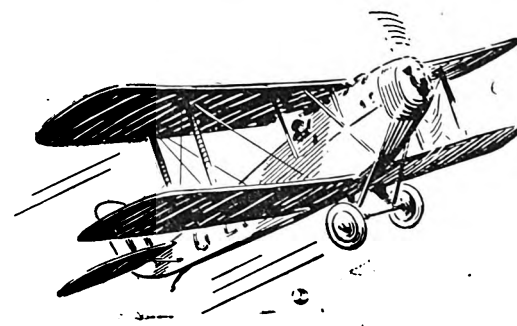
CARTER—MACANDREW.—The marriage arranged between Flt. Lt. G. P. H. Carter, R.A.F., and Miss Ester Macandrew, Aisthorpe, Inverness, will take place on Mar. 20 at the Garrison Church, Moascar, Ismailia, Egypt.

PELLY—SPENCER.—On Feb. 15, at All Saints', Hove, by Rev. D. R. Pelly, Claude Bernard Raymond Pelly, R.A.F., eldest son of Rev. and Mrs. D. R. Pelly, of Woolbeding, Sussex, to Margaret Ogilvie, only daughter of Mr. E. J. Spencer, of Grand Avenue, Hove, and the late Mrs. Spencer.

Deaths.

FELL.—On Feb. 13, at Kenley, Surrey, as the result of a flying accident, Sjt. Cecil Alfred Arthur Fell, R.A.F.

VOLK.—On Feb. 17, in London, Ella, the beloved wife of Herman Volk, of Little Grange, Roedean, Brighton. Funeral at Ovingdean Churchyard, Sussex, on Thursday, Feb. 20.



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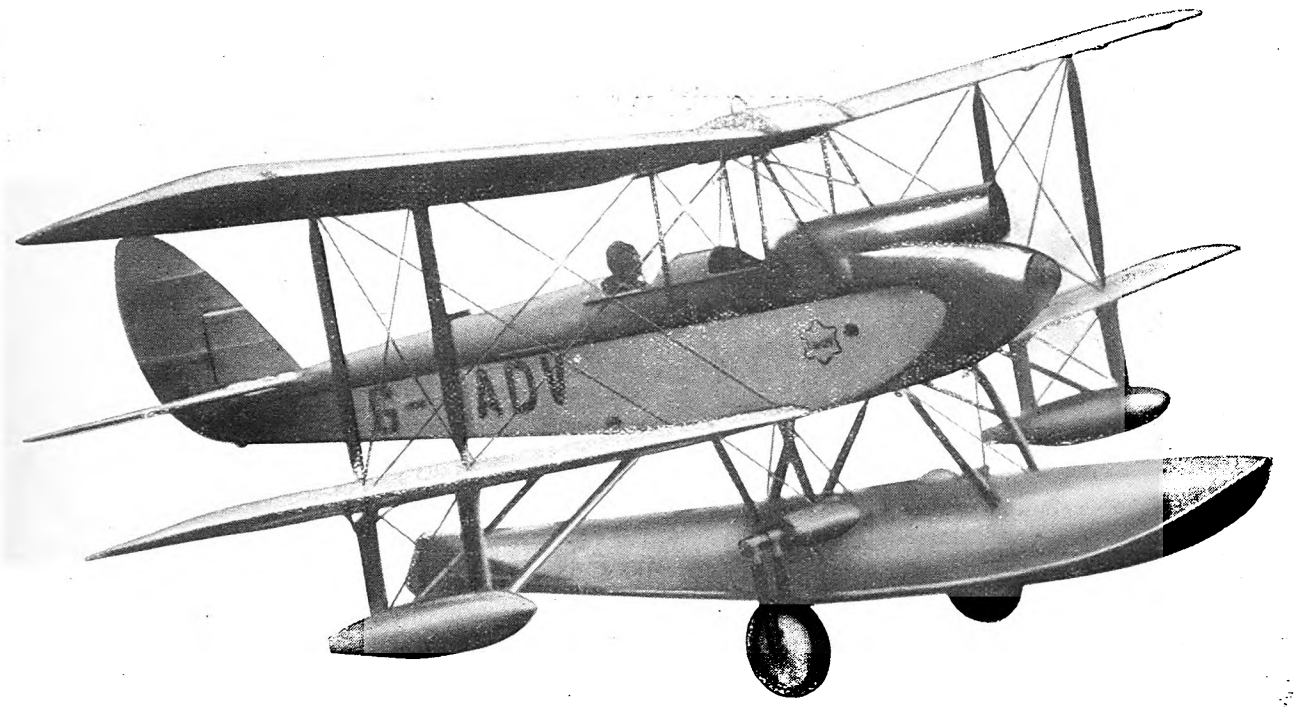

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THE AEROPLANE

6d. Weekly.

INCORPORATING AERONAUTICAL ENGINEERING

Edited by C.G.Grey

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FEB. 26, 1930.

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Incorporating

Aeronautical Engineering

VOL. XXXVIII. No. 9.

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AIRCRAFT AS THEY MIGHT BE.—II.

(A Would-Be Humorous Paper Read Before The Leeds and Brough Branch of the Royal Aeronautical Society.)

(*Continued from page* 288.)

REVERSION TO TYPE.

Assuming that we can get our variable-angle wings in the way suggested, there is a possibility of going a step further along a line which brings us back to the very earliest days of Aviation.

In this connection perhaps I may sidetrack for a few minutes to point out that practically every form of mechanism in its ultimate development comes very close in shape to its most elementary form. In between the two it goes through a process of elaboration, complication and eventually of what Mr. William Stout calls simplication.

Take for example the ship. Man's first idea of a ship was a log hollowed out, inside which he sat. Then ships became more and more elaborate, till they reached the high-water mark of elaboration with the Elizabethan galleons and our five-masted clippers of the early nineteenth century with innumerable sails. Then we came down to simple iron ships with a few sticks on top, and now we have arrived at motor-ships, which only carry funnels for the look of the thing, and at submarines, which are virtually steel logs with everything inside them.

In a simpler thing, the first bicycle consisted of two little wheels with a backbone between, on which a man sat and paddled himself with his feet on the ground. Then we came to the high wire-wheeled bicycle and the various kinds of complicated velocipede, and now we have come back to the motor-bicycle, which is wonderfully like the original Dandy-Horse, as it was called, merely with an engine added between the wheels.

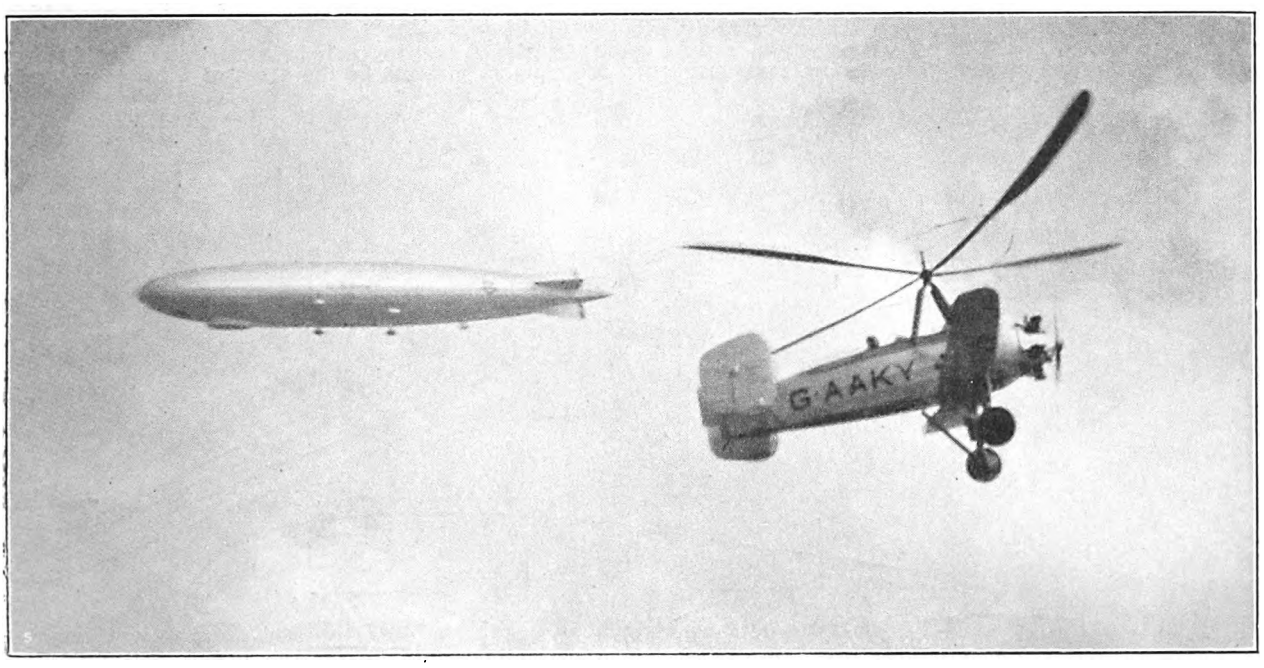
Or to take even a simpler thing. Man first shaved himself with a sharpened oyster-shell. Then all kinds of elaborate hand-knives and razors were invented, and now we have come back to a safety-razor which is more like a shell with a handle stuck to it than anything else.

Somewhat in a similar way, the most elementary idea of an aeroplane was a birdlike monoplane, such was that tried in glider form by Sir George Caley in the very early eighteen hundreds, and by Henson and Stringfellow in about 1840, and by Lilienthal, and others, in the 1890's, or thereabouts.

But we must also remember that somewhere about 1888 some very interesting experiments were made by the late Horatio Phillips somewhere down in Sussex, who built an aeroplane very like a Venetian blind. The thing lifted itself off the ground at very low speed, but as he only ran it round a circular track it never had an opportunity of making a free flight. And if it had done so it would certainly have wrecked itself, for it had no proper ideas of lateral control or stability.

"I MUST HAVE LIBERTY WITHAL, AS LARGE A CHARTER AS THE WIND."

(SHAKSPEARE—*Merchant of Venice.*)



SHIPS THAT PASS.—The Cierva Autogiro and the U.S. Navy airship, "Los Angeles," flying at the 1929 Cleveland Air Meeting. The "Los Angeles" was, before being taken over by the U.S. Navy, the Zeppelin L.Z.126 and was flown from Germany to America across the Atlantic. The Autogiro shown is a British-built version with the Armstrong Siddeley Genet engine and the self-starting tail-unit.

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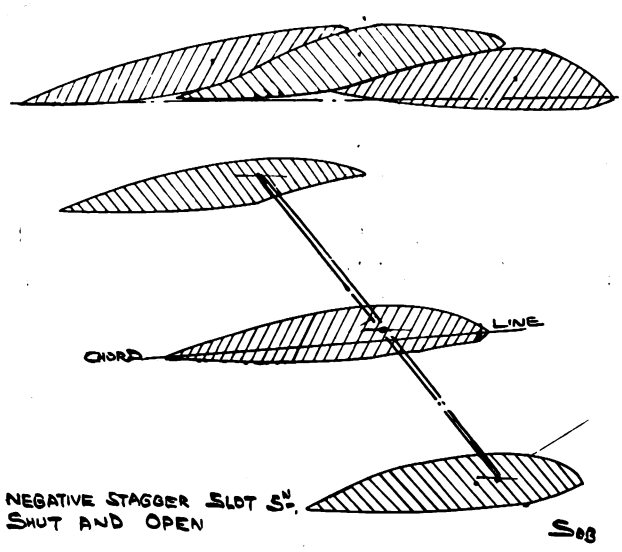
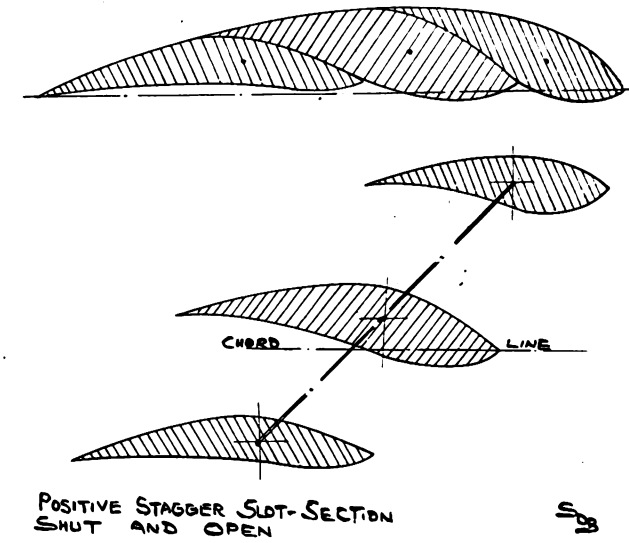




The fact remains that this Venetian blind idea did give an enormous amount of lift at a very low speed.

Now, suppose we were to work on the idea of a monoplane with high aspect-ratio, built in such a way that the outer two-thirds of the wing could be partially rotated round a suitable axis, and that the outer portion of the wing could be designed so that when it was rotated the wing opened out into a series of slats like a Venetian blind, should we be getting any nearer what we want?

If such a thing were possible we probably should.

The Venetian blind would give us a very high lift at a very low speed. It would also probably give enormous head-resistance. That is exactly what we should want when coming in to land slowly.

Naturally, each slat of the Venetian blind would be a proper aerofoil structure. Then we might find ourselves up against Mr. Handley Page's slot patents.

Even supposing we did, we should probably do very well out of it, and Mr. Handley Page would hardly object to our building a purely experimental machine on those lines as a method of scientific research.

If it did all that it ought to do we could very well afford to pay him a handsome royalty per machine, and not a royalty per foot run of slots. And the resultant increase in the sale of aircraft thus equipped would probably make his fortune and ours.

OVERLAP.

Meantime there seems to be another possibility which is rather interesting, as shown in Mr. Bradshaw's sketch herewith. Instead of making whole Venetian blinds, we might build three, or perhaps four, mono-spar wings with a very high aspect-ratio, on the German principle, with a flexible trailing edge. And we might fit them all to a beam arrangement which would fit onto the end of the fixed portion of our wing.

The sketch shows more or less diagrammatically how the thing *might* work. I leave to some of our bright engineers the problem of working out the precise mechanism with which it could be made to work without making the weight of the whole thing so great that the machine would barely lift itself, and so would cease to be a commercial proposition.

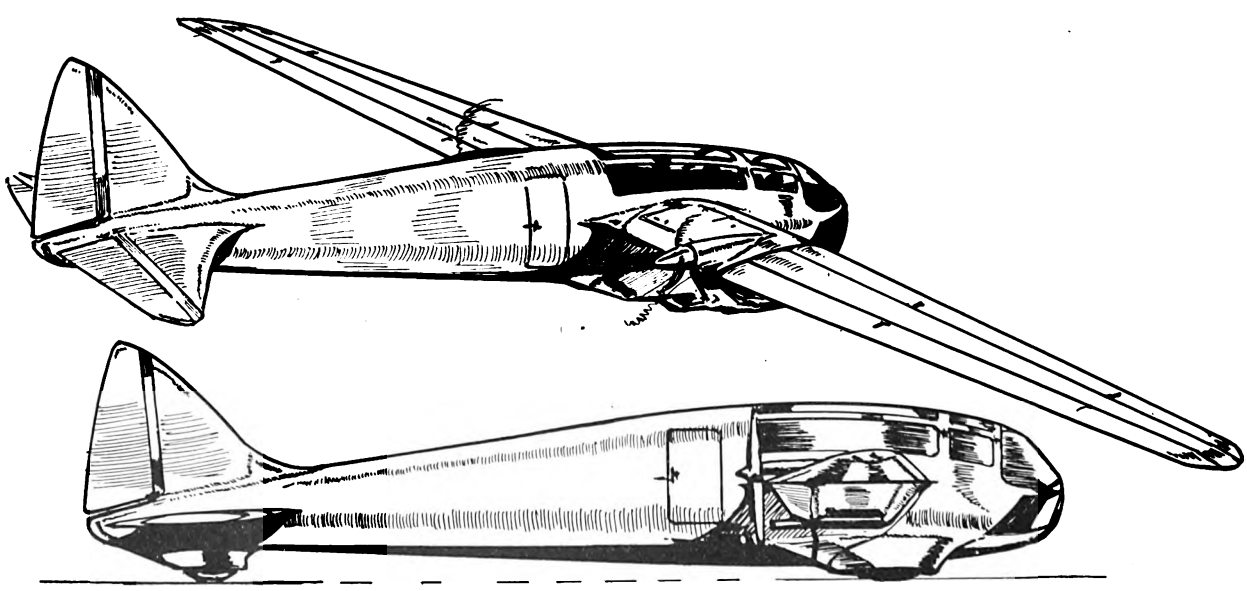
Hereabouts we strike rather an interesting point. If you arrange these wings so that the upper one overlaps the second and the second overlaps the third, when you open them out you must produce an effect almost exactly like a Handley Page Slot.

But the curious fact is that the feathers of a bird do not overlap in that particular way. They overlap in exactly the opposite direction. That is to say, each feather overlaps the feather in front of it instead of overlapping the feather behind it,—which they would do if they worked in the same way as Mr. Handley Page's slots do.

So if we wish to avoid Mr. Handley Page's patent, unless, as is most likely, he has already patented it himself, we might rotate the beam in the opposite direction, and so make the outer portion of our wings into a backward-staggered triplane.

During the War some very good work was done with triplanes but in them the planes were always staggered forward, that is to say the uppermost plane was in front of the lowest. At one time or another several biplanes have been built with the wings staggered backwards. But there has been a general idea that they did not land as slowly as those with a forward stagger.

There would at any rate be some interest in discovering what precisely would be the effect of a back-staggered tri-



A FLIGHT OF IMAGINATION.—Built-in engines: Rotatable Venetian-blind wings: Almost no undercarriage.

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CAIRO-CAPE FLIGHT.

PUNCTUAL ARRIVAL OF R.A.F. AEROPLANES.

CAPE TOWN, Saturday.

The four R.A.F. aeroplanes taking part in the annual flight from Cairo to Cape Town have reached their destination with the punctuality of an express train, arriving here this morning.

When the aeroplanes left Cairo on January 11, February 1 was fixed as the date on which they were to reach Cape Town, and, despite very bad weather over Rhodesia, they have kept to their time-table.

The personnel was provided by the 14th Bombing Squadron stationed at Amman, Transjordan, and the flight was under the command of Flight-Lieutenant C. B. Greet.

SUNDAY TIMES
2nd Feb. 1930

For the fifth successive year the Royal Air Force have selected for this flight Fairey aircraft fitted with

NAPIER

Aero Engines

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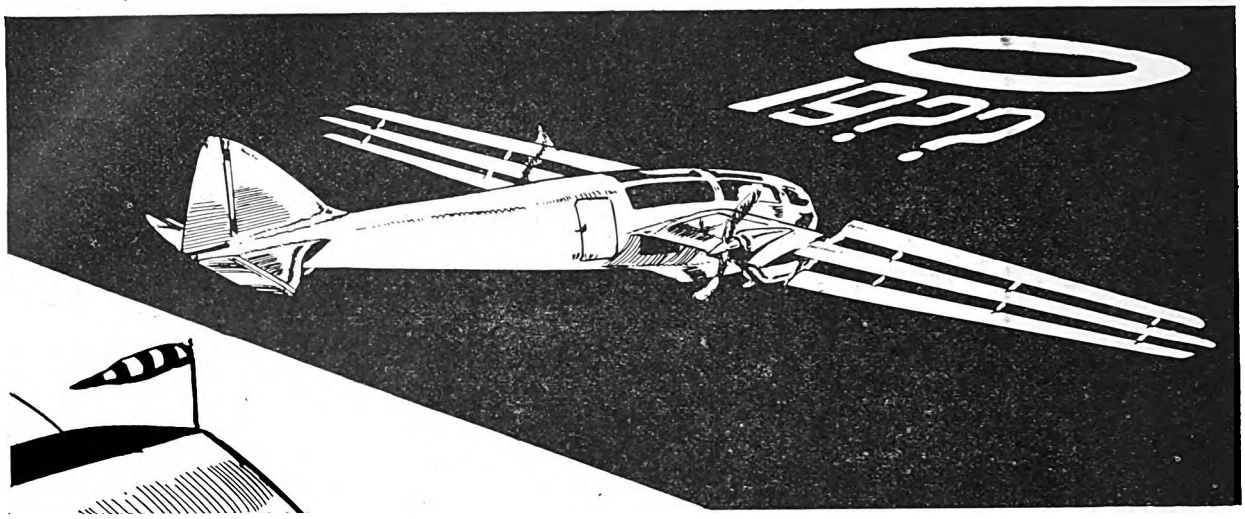


A NEW YEAR'S GREETING OF 19??.—The Venetian-Blinder alighting.

plane of very high aspect-ratio. Something might be done about it just for fun.

After all the thing that we want most in Civil Aviation is a slow get-off and slow landing with a high flying speed when once in the air. And as Commercial Aviation is where the big money lies in the future, the expenditure of a fair amount of money now would be quite worth while.

THE BEST SHAPE.

Now you see where this line of thought is leading us. Not having to get the tail of the machine off the ground so as to take a run and drop the tail and pull the machine off the ground, we can build a good deep comfortable fuselage and we can practically fix the wheels direct to the underneath part of the fuselage. And there ought to be no difficulty about retracting them right into the fuselage.

Also we can put those wheels very far forward so that there is no chance of the machine turning over on its nose when the brakes are jammed on,—for of course, being modern, we shall have brakes. And, instead of a tail-skid to chew up the surface of aerodromes, we shall have a swivelling tail-wheel practically built into a lower fin.

Thus you may get a fuselage which is more likely to be the right streamline than anything which has been built up to the present.

Mind you I am not quarrelling with any existing streamline designs. They have all been built by eminent engineers who have had high-class scientific training, which I certainly have not had. The fact that they all differ so much in shape is merely very unfortunate.

All we can argue is that the gliding angle of every aeroplane in the World is much worse than it ought to be. And from that we can draw the assumption, presumably without offence to anybody, that somewhere or another there *is* a better shape of fuselage than anything we have got at present.

Those of you who have read Mr. R. J. Mitchell's interesting article in THE AEROPLANE of Dec. 26, on the influence of Speed-Flying on Design may remember how it showed that by combining two different component parts of an aeroplane the head resistance of the two parts combined often works out at less than the sum of the head resistance of the two parts considered independently and then added together. So evidently there is a great deal to be learned about the right way of combining wings with fuselages and fuselages with fins and tailplanes and so forth. And nobody can lay down the law about any particular shape or combination of fuselage and components.

One thing that is certain is that the ordinary type of undercarriage as used to-day mops up more power by its head-resistance than does any other one part of the machine. I am told by eminent scientists, whose opinion is probably as reputable as that of anybody else, that the undercarriage of any normal type of aeroplane puts up one-third of the total head-resistance of the whole aeroplane, wings and fuselage and all. So obviously if you can wash out your undercarriage you are going to get an enormous saving of power.

As soon as you can start your whole aeroplane on a level keel without having to drop the tail and then cock it up again and then drop it again, you can practically do away with your undercarriage.

There is another advantage about this. Remember, if you have to start with your tail low down and the nose of your machine up in the air, you bring the trailing edge of your wings so low down that the position limits the size of the airscrews you can use. If you can start with your wings at their proper flying angle, that is to say with the tail up instead of down, your airscrews are higher off the ground and consequently you can use larger screws.

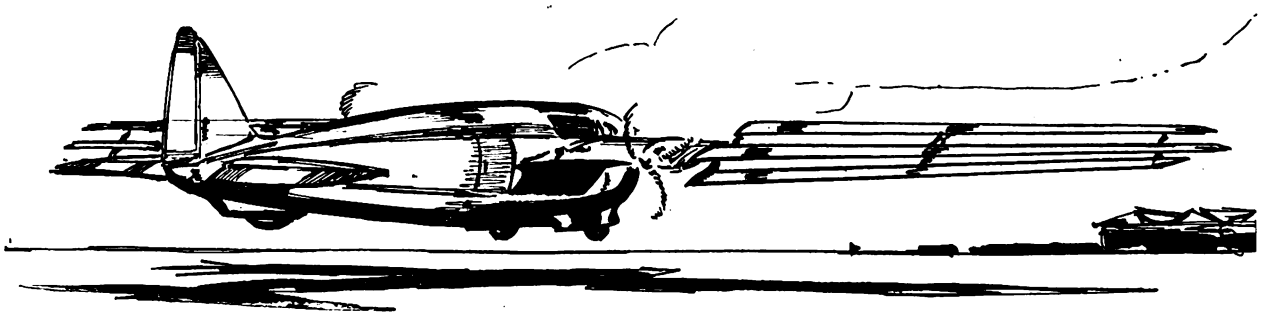
That is merely one of the advantages that happen by sheer good fortune. Like the direction of travel of the sleeve-valves in a Daimler-Knight engine.

There is a legend that somebody once asked Professor Lanchester how he managed to design the sleeve-valves of a Daimler, so that they were both travelling up at the same time and both down at the same time, though at different speeds. The story says that he answered that it was only by the Grace of God. No design could have done it,—it merely happened that way. And that if God had willed that they should work in opposite directions, the engine could not have worked.

Anyhow that is so far as we got with our argument about the design of the aeroplane as it ought to be.

FLYING-BOATS.

After that somebody pointed out that with rotating wings which opened out and gave inreased lift at low speed, the whole problem of flying-boats could be very much simplified. There would be no need to rush a boat along until it managed to get up on its step so that the tail could be depressed and give the wings the proper angle for getting off. Boats could be built with whatever form of bottom was most satisfactory for navigation and control on the water. And they would simply be lifted clean out of the water by their wings, as any respectable aeroplane should be. Moreover there would be no danger of producing a boat, which as I have been told some boats do, has an awkward period in which the water refuses to bear it, and the air refuses to take it,



AN HORRIFIC DREAM.—The Venetian-Blinder gettin off.

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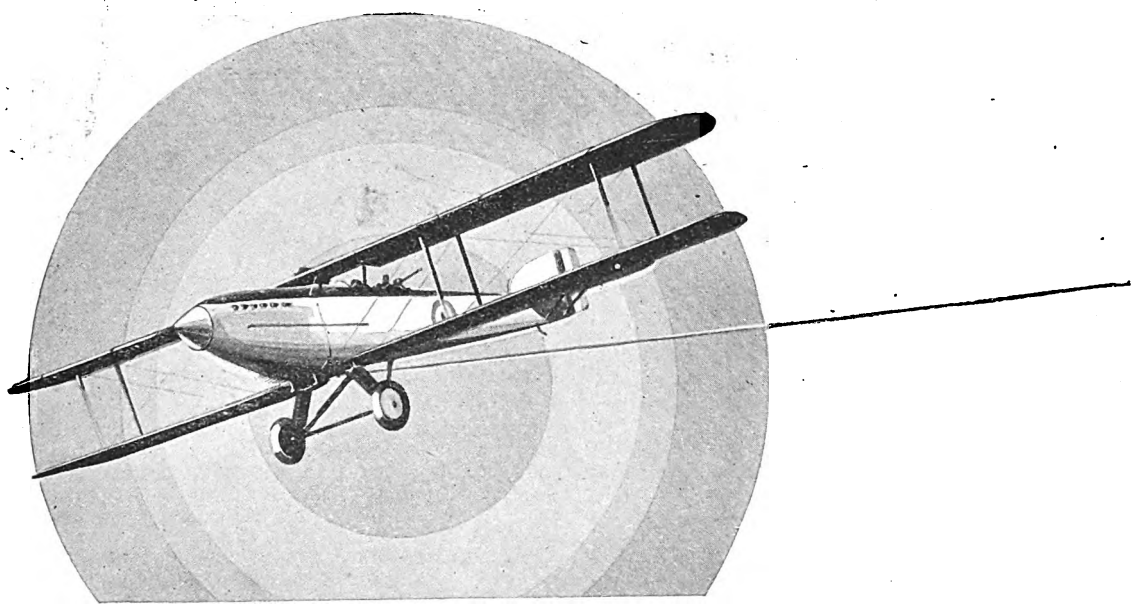

FAIREY

AIRCRAFT

THE FAIREY AVIATION COMPANY LIMITED.
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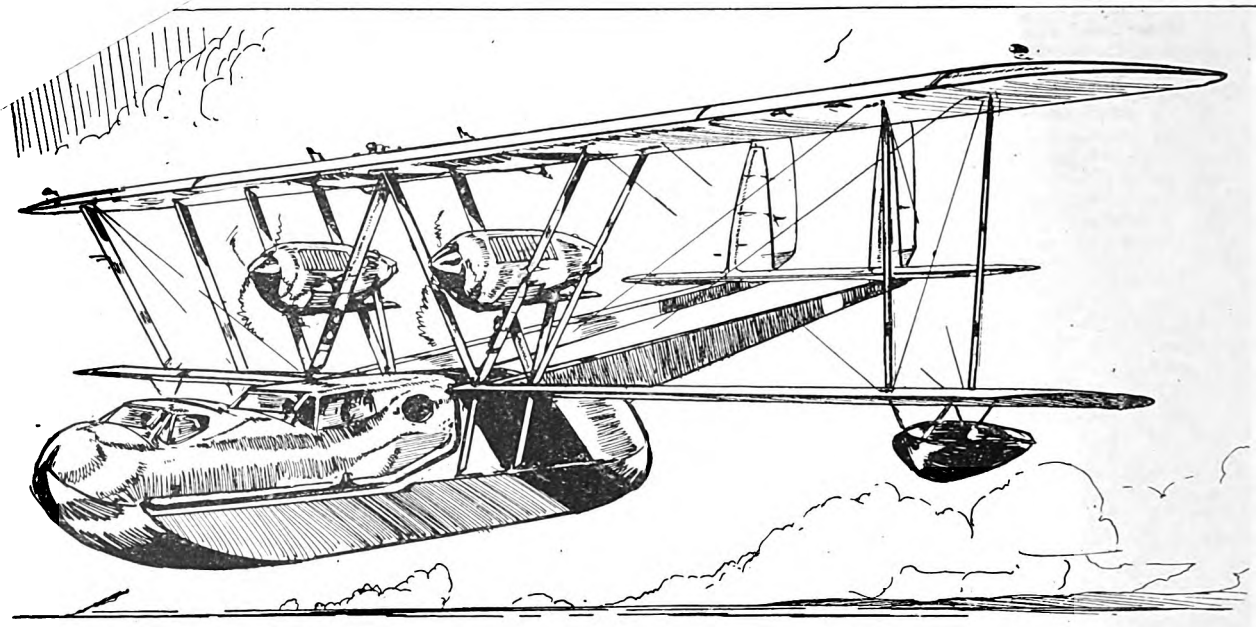


ANOTHER FLIGHT OF FANCY.—A very imaginary flying-boat with a detachable portion of the hull forming a lifeboat. This portion is carried between the chines on slides, so that it can be released when the machine is on the water.

—so that the wretched thing is rejected by the water and is not air-borne.

Hereabouts I broke in with another of my pet fads, that is the crying need for a flying-boat which will have part of its hull designed as a sea-going lifeboat which can be released bodily from the rest of the structure. So Mr. Bradshaw and I set to work and roughed out an idea of what such a machine would look like.

The notion is not by any means new. It was produced early in the War by Mr. Pemberton Billing and it has been mentioned in THE AEROPLANE on various occasions. But some of you may not have heard of the original machine.

As Mr. Pemberton Billing intended it, the machine was to alight in Southampton Water where there is plenty of room, tie up to one of the moorings intended for the big liners well down the Water, and then the hull as an independent motor-boat was to come up to the pier to debark and embark passengers and freight.

Then it was to go down to where its wings were moored, lock into the wings and fly away again.

That in itself should be a very nice arrangement for any commercial seaplane line if it could be worked. It would save an enormous amount of messing about with tenders and boats and things, with consequent risk of damage by ham-handed sailor-men. But the real reason, and the most essential reason, for developing the idea, to my mind, is the need for a genuine lifeboat.

The best of aeroplanes may be forced to alight at one time or another, and the most seaworthy of flying-boats may strike such a sea that it cannot live in it. As there seem to be no aerodynamic difficulties about building the hull of a flying-boat in such a way that the fore part of it can be a seaworthy lifeboat, the difficulties are purely mechanical, and I believe that any competent Clydeside engineer, if he put his mind to it, could get over them.

Probably the regular Clydesider trained on ships where weight is no object might make the job unduly heavy. So then the experienced aircraft engineer, who is used to thinking in ounces instead of in tons, could set to work and chop out the weight which the Clydesider had put in.

As a matter of fact, there is no need to import engineers for the job at all, because I know of at least half-a-dozen competent aircraft engineers who happen to be Clydesiders, either by birth or by training.

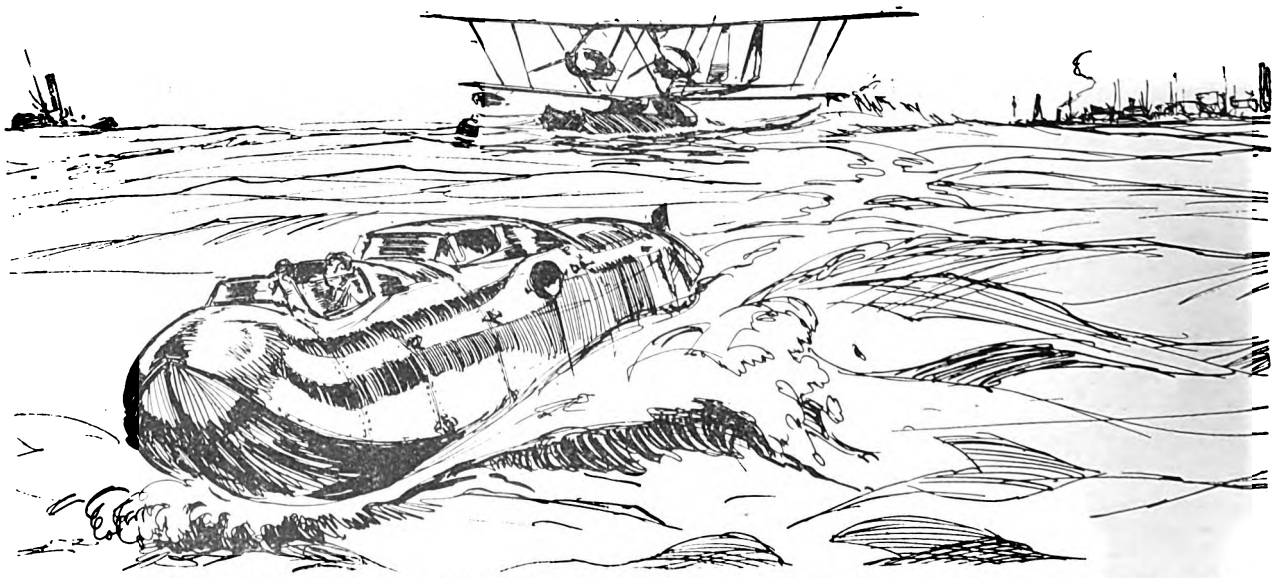
Quite seriously I do suggest that this last idea should be given very deep consideration by all designers of flying-boats.

POLITICAL CONSIDERATIONS.

At present all our long-range air lines depend on he goodwill of nations who, in fact, have no particular goodwill for us. The communications of the British Empire should be independent of the ill-will or good-will of any other nation, and we can only achieve such communications by developing our flying-boats.

There is an old saying that one can forgive an injury but that one can never forgive an obligation. At the present moment we are under an obligation to every country over which our air lines fly to our own possessions.

Operating air lines between one country and another country for the mutual benefit of both countries is another



SHOREWARD BOUND.—The detachable part of the hull going up to the docks, leaving the flying apparatus moored out.

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matter altogether. In that case each country is under an obligation to the other, and the obligations cancel out. But our Imperial Air Routes should be run, or at any rate we should be able to run them, without saying "By your leave," or "Thank you," to anybody. And we can only achieve that happy position by using flying-boats.

When once we have produced a flying-boat that can go non-stop from Plymouth to Gibraltar, then there is no need for us to be under any obligation to anybody.

There is no harm in knowing that if needs be we can bring our flying-boats into a friendly French harbour, and there is no harm in having a cordial understanding with our ancient allies the Portuguese for the regular use of a landing-place in the Tagus near Lisbon. That merely means that we can make a stop there to refuel, and carry that much extra load. But our first object, whether we are considering the production of big flying-boats for use in time of war, or whether we are merely considering developing air-mail lines, should be a flying-boat that can do England to Gibraltar non-stop.

Now obviously a flying-boat which has to operate over such notoriously wicked seas as those of the Bay of Biscay and the coasts of Spain and Portugal must be equipped so that in the event of being forced down the crew and passengers have at least as good a chance of survival as if they were in an ordinary tramp steamer which was foundering in those same seas and they were obliged to take to the boats.

I feel sure that the first firm in the Aircraft Industry which tackles this problem seriously and gets away with a satisfactory solution of it will reap a handsome reward.

I regret taking this serious note at the end of a discourse which is purely intended from the start as a joke, and I can only hope that any mild amusement which you may have had out of the first part of it will compensate for the seriousness. Possibly your amusement may take the form of laughing at the ideas in this discourse rather than with them. But, as I have said, there is many a true word spoken in jest, and he who laughs last laughs best.

Some of us have already lived long enough to see things which were regarded as a joke become very useful paying propositions, and I can only hope that the most ridiculous of these ideas may conceivably give others which will be really useful.—C. G. G.

POSTSCRIPTUM.

[After this lecture had been inflicated on a long-suffering audience various people raised arguments about it. A phrase which deserved to be perpetuated was that of Mr. Duncan who, when called upon to open the discussion, said that "opening a discussion means saying something without meaning anything." But as a matter of fact what he said meant quite a good deal.

He suggested that to streamline a machine still further we might have put the landing wheels fore and aft. This in fact has been done by Mr. Grover Loening in the States with his amphibian. He keeps the machine from rolling over sideways by using a kind of sprung skid on the wing-tips.

Another interesting suggestion by Mr. Duncan was that instead of shutting people up in limousines we might do better to design open machines which had no draught. The idea is worth investigating, but there is a story about one cabin aeroplane which was made with a sliding roof. When the roof was opened the Managing Director of the firm lost a perfectly good bowler hat which he was wearing especially to demonstrate the beauties of a cabin machine, and the pilot, who was rather light, was nearly sucked out of his seat.

One imagines that any open machine must necessarily be an extremely bad streamline. Further, one suggests that a thoroughly well-ventilated limousine would be preferable, and in any case, flying at any considerable height is a cold job and the warming of a cabin is very much easier than the warming of individual passengers.

MR. NORMAN BLACKBURN recalled the early Bréguêts which had monospar wings,—and terrible things they were. Most people seem to have forgotten that the early Bréguêts only had one spar. Mr. Blackburn said that he agreed with the suggested method of doing away with the undercarriage. Also he was interested in the theory of improving the efficiency of a wing by using a flexible trailing edge.

MR. CRAWSHAW said that he agreed with the scheme for variable incidence, but wondered how the mechanical difficulties would be overcome.

MR. BOLTON asked what we should do with 12 ft. 6 in. airscrews on the trailing edge. The answer to that is that with pusher screws and multiple engines 12 ft. 6 in. airscrews would not be used, except perhaps in enormously large machines of very high power, and then there would be room enough for them.

There are certain quite knowledgeable aerodynamic scientists who believe that we have not yet begun to understand the possibilities of very high-speed airscrews. One has heard such an expert say that quite possibly a small airscrew running at 4,000 or 5,000 r.p.m. may be more efficient than a big airscrew running at 1,000 r.p.m. Thus one foresees the possibilities of an aeroplane with a multiplicity of tiny high-geared airscrews buzzing along the trailing edge.

One believes that the big geared airscrew is only necessary in the modern aeroplane simply because people will insist on putting the airscrew right in front of a huge fuselage capable of holding two or even three people abreast. Consequently unless an airscrew is so long that the major portion of each blade projects beyond frontal area of the sides and top and bottom of the fuselage the airscrew must be quite inefficient. The probability is that if the airscrew were at the trailing edge of the wing where the air is led into it in a disturbed condition, and where the whole airscrew would be doing good work right down to the hub, a much smaller and lighter airscrew running much faster would do the work.

MR. HARGREAVES suggested that possibly jet propulsion might be the solution of all our troubles. This also is remotely a possibility.

MR. FENTON closed the discussion by wanting to know how we proposed to get our machine through Farnborough. The answer is briefly that probably by the time such a machine is built, Farnborough will have ceased to exist. And that date will probably be about the Greek Kalends.—C. G. G.]

THE PRINCE AT NAIROBI.

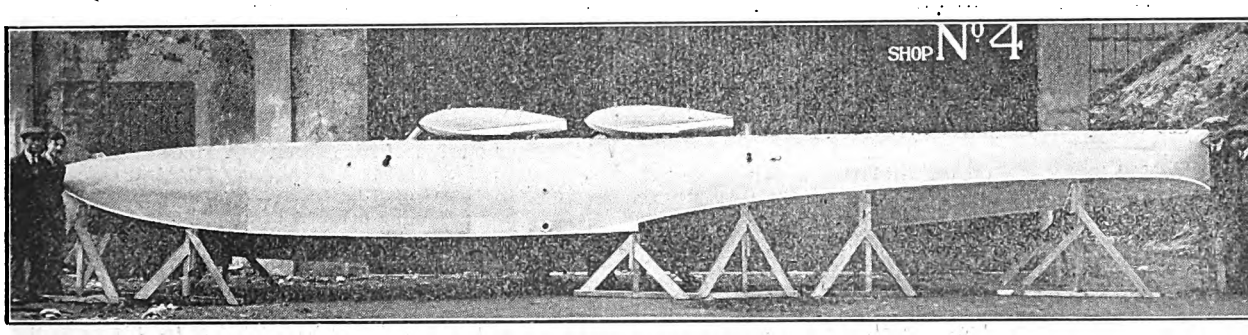
On Feb. 23, H.R.H. The Prince of Wales paid an informal visit to the aerodrome at Nairobi. He made a short flight with Mr. Campbell Black in a D.H. Gipsy Moth and was flown over the Athi Plain Game Reserve.

The Prince inspected the Avro Five (three Armstrong Siddeley Genet Major engines), *Knight of the Grail*. Just before this inspection Mr. Wolley Dod and the Imperial Airway's survey party had flown from Kisumu in this machine.

THE RESISTANCE OF AIR-COOLED ENGINES.

On Mar. 6, at 18.30 hrs., Major F. M. Green and Mr. H. C. H. Townend will read their paper on The Resistance of Air-cooled Engines and the Townend Ring. The lecture will be at 18, John Street, Adelphi, W.C.2.

The lecture will be fully illustrated and Mr. Townend will give demonstrations to show the remarkable effects of his ring. The principle of the Ring is now being applied for other drag-reducing purposes.



THE FLOAT FAMILY.—Here are the largest and smallest floats made by Short Brothers Ltd., who are now recognised as the World's leading float makers as well as makers of flying-boats which are unsurpassed in their class. The Father of all Floats is one for the big three-engined monoplane which Short Brothers are now building. It is approximately 40 feet long and has a displacement of 22,600 lbs. The small floats which are the wing-tip floats for the light amphibian have a displacement of 180 lbs.

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A YORKSHIRE PIONEER.

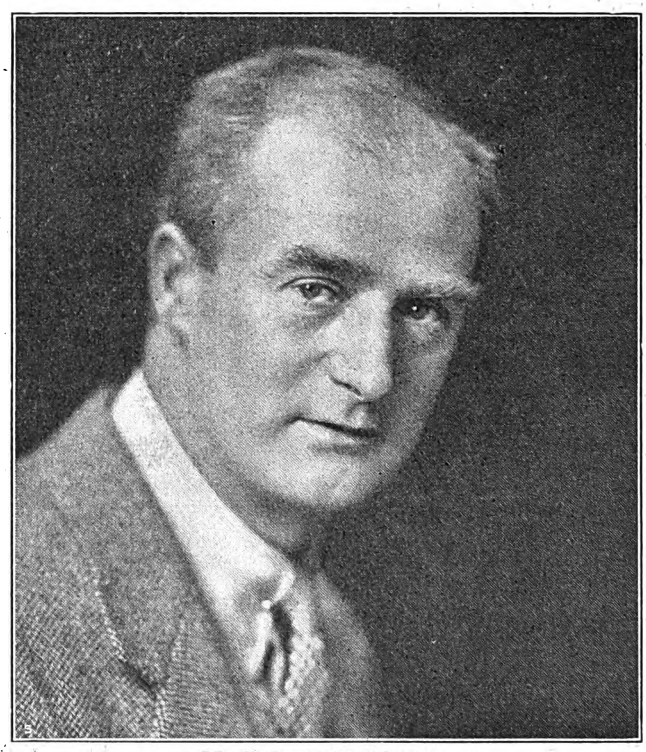
Among the pioneers of the Aircraft Industry in Great Britain few can lay claim to a more sincere faith in the practical possibilities of aircraft than Mr. Robert Blackburn. At a time when aeroplanes were looked on as scientific toys, and their pilots as venturesome visionaries, he was already laying his plans solidly for the future commercial development of aeronautics.

A Yorkshireman, he is the son of the late Mr. G. W. Blackburn and was born in 1885. After being educated at Leeds Modern School, he took a degree in engineering with honours at Leeds University. He then proceeded to Germany, where he studied practical and technical engineering for two years and subsequently spent another year and a half in Belgium and France, equipping himself further on the scientific side of his profession.

Mr. Blackburn's visit to France was perhaps the turning-point in his career, for it was in Paris that he first took an active interest in aviation. His keenness was undoubtedly stimulated by meeting the Wright Brothers, and on his return to England in 1908 he at once began experiments in flying. Mr. Blackburn actually designed, constructed, and piloted his first machine all within a few months of his return from Paris.

It was on Saltburn Sands in North Yorkshire, twenty-one years ago, he made his first flight and, in face of much scepticism and at considerable personal risk, he triumphantly demonstrated the flying powers of this, the earliest type of Blackburn aeroplane. His next enterprise was to start a business for manufacturing aeroplanes on a small scale, and from this nucleus the great Blackburn Aeroplane and Motor Company eventually developed.

In those early days Mr. Blackburn met with much opposition from short-sighted friends, and the success of the company is almost entirely due to his prescience and persistence. He has conducted the business from its inception as an entirely personal affair and still exercises a controlling interest in the present-day company.



Mr. Robert Blackburn.

In the years before the war Mr. Blackburn produced a number of exceedingly good aeroplanes which made history in the early days of aviation. One of his machines was the first to fly across the Bristol Channel. The late Captain B. C. Hucks learnt to fly on a Blackburn monoplane, known as the Mercury. This machine was entered for the "Circuit of Britain" race in 1911 and, after putting up a remarkably good performance, had the misfortune to land on a barbed wire fence which damaged it considerably. Although repairs were made in 24 hours the pilot considered he had no further opportunity of winning the race and accordingly flew back to the company's hangar.

As a further example of Mr. Blackburn's enterprise, it is worth recording that in 1911 he built one of the first, if not the first, successful all-metal aeroplanes in this country. This machine was a two-seater military monoplane built almost entirely of round and oval section steel tubing, and the construction was based on very similar principles to those in use to-day on the most modern types of all-metal aircraft.

It was in 1912 that Mr. Blackburn started a private company for building aeroplanes and he made such progress that by 1914, on the outbreak of the Great War, he was fairly well prepared to take a very large share of the work necessary to supply aircraft for sea and land fighting. The actual part taken by the Blackburn Company in the war is now a matter of history. Subsequently, Mr. Blackburn has more largely developed the construction of aeroplanes and flying-boats for commercial purposes.

There is also a subsidiary company, likewise controlled by Mr. Blackburn, which he founded to promote air transport as distinct from the manufacturing side. This company, known as the North Sea Aerial and General Transport Ltd., has Mr. Blackburn as its chairman. He is further a director of another subsidiary company named Blackburn Aircraft Products Ltd., and of Cobham-Blackburn Air Lines Ltd. The latter company pioneered and carried out the preliminary survey service of the African air route, which is to be operated by Imperial Airways (Africa) Ltd., in which concern the Cobham-Blackburn Company holds a large interest. The permanent service, which is to be put into operation in the near future, will be one of the largest and most important Imperial air routes in the world.

Mr. Blackburn was instrumental in starting many factories abroad. His most important foreign enterprise was the establishment and organisation of the Greek National Aircraft Factory at Phaleron, near Athens. He has also sold licences for Blackburn aircraft to Finland and Japan. A Blackburn Aircraft Corporation of America has also been formed within the past twelve months.

Steady development has always been the note of Mr. Blackburn's business and to-day his company ranks as one of the leading British manufacturers of aircraft. During the war they were practically the sole constructors of torpedo aircraft for the Navy. In spite of the return to peace conditions, the present output of aeroplanes from the Blackburn works is larger than at any time during the war.

At the termination of the war Mr. Blackburn was honoured by having conferred upon him the O.B.E. in recognition of his services to the country. In 1918 he was made a Fellow of the Royal Aeronautical Society. In 1927 the Greek Government honoured him by conferring upon him the Gold Cross of the Order of the Saviour. He is also a member of the Institution of Mechanical Engineers, a member of the Institute of Aeronautical Engineers, and an Associate Member of the Institution of Civil Engineers.

On Feb. 21, 1930, the staffs of the Blackburn Aeroplane and Motor Co. Ltd., and the North Sea Aerial and General Transport Ltd., gave a Dinner and Dance at Powolny's Restaurant, Hull, to celebrate the completion of Mr. Blackburn's twenty-one years' connection with aviation.

Over 250 people assembled to pay a tribute to "Bob" Blackburn, and a very happy and successful evening was the result.

After the Royal Toast, Mr. A. G. McCulloch, Chief Inspector, proposed the toast "The Guest of Honour." He outlined the early experiences of Mr. Blackburn and recalled the fact that not so very long ago a Royal Aero Club Committee had after some deliberation, decided who was the first British subject to fly in the British Isles, and that the date of this first flight was Apr. 30, 1909. His information showed that Mr. Robert Blackburn had made a straight flight of a few hundred yards a few feet from the ground prior to Apr. 30, 1909, and he expressed the opinion that in the past Mr. Blackburn had neglected the bold and useful art of blowing his own trumpet and he wondered if modesty and the lack of an efficient performance on the aforesaid musical instrument prevented him from submitting his claim to the Aero Club Committee.

At the conclusion of his speech Mr. McCulloch then asked Mr. Blackburn to accept a mahogany Cocktail Cabinet with cut glass fittings together with a signed address from the Directors and Staffs as a token of their very sincere esteem.

Mr. Robert Blackburn, who was received with musical honours, said that he was very proud to have received such a gesture of goodwill from all those people who have been associated with him in the past and at the present.

He paid tribute to those who were his associates in the very early days and in particular to his father and mother who, when he decided to give up his engineering career for aviation, said "Well, if you like it and want to be a fool, go ahead." He recalled his early pilots—the late Capt. B. C. Hucks, Harold Blackburn (now Wing Commander, late

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919,320 Argosy Miles

DURING the past 4 years (to October 31st, 1929), seven Argosies in the European Fleet of Imperial Airways Limited have flown 919,320 miles in 10,118 hours. They have carried over 50,000 passengers; they have crossed the channel nearly 4,000 times.

The Argosies are the safest, best paying and most easily maintained Air Liners in existence.

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R.A.F.), Malcolm Christie (now Wing Commander, late R.A.F.) Glew, Buss and his brother Norman—who demonstrated his early machines and to them he credited all the "dirty work" which enabled him to prove to British aviation that flying machines were safe.

He paid tribute to those mechanics who worked with him in the early days—Harry Goodyear, Mark Swan, Arthur Mason, and George Watson.

In conclusion he said that in spite of the irregularities of the financial returns, he was absolutely satisfied that Fate and Providence had brought him into aviation. With the loyalty he has seen around him—the loyalty of his staff, the co-operation he has had from those Air Ministry colleagues who have been closely associated with him—with all these things he believed that his company will go a long way in the development of the future of British Aviation.

Mr. Norman Blackburn proposed the toast of "The Ladies" in a humorous vein, and this was responded to by Miss Lees. Hereabouts a bouquet subscribed for by the ladies of the staff was presented to Mrs. Robert Blackburn by Miss Daisy Smith, the oldest lady member of the company.

The toast of "The Air Ministry" was given by Major J. D. Rennie, the Chief Seaplane Designer of the company, and it was responded to by Mr. T. J. Gray, of the Air Ministry. That to "The Resident Government Officials" was proposed by Mr. T. Emsley, Assistant Chief Draughtsman, and responded to by Mr. W. D. Murray, the Resident Technical Officer.

Mr. Charles Blackburn welcomed "The Visitors," and his toast was replied to by Mr. Chapman, of Wm. Jessop and Son, Ltd., of Sheffield, the well-known steel manufacturers.

The toast, "The Prosperity of the Blackburn and North Sea Companies," was proposed by Mr. L. E. Metcalfe, Chief Draughtsman, and responded to by Mr. E. Hudson, Director and Secretary of the Companies. After he had replied, he presented, on behalf of the Directors, silver cigarette cases, suitably inscribed, to Mr. Mark Swan (Inspection Dept.), the oldest member of the staff, Mr. Arthur Mason (Foreman, Erection Dept.), and Mr. George Watson (Foreman, Experimental Erection Dept.), also very old members of the staff, in recognition of their long service and excellent work.

AN EPIC OF THE NORTH.

Some time in September of last year Col. C. D. H. MacAlpine, President of Dominion Explorers Ltd., with a party of seven left Winnipeg in two seaplanes on an exploratory expedition to the extreme north of the North-West Territories on the Arctic Circle. One of the machines was wrecked at Churchill on Hudson Bay at the outset. This delayed the expedition for one week. Fall conditions set in a week before expected and all lakes began to freeze over, so that seaplanes were useless and skis could not be used until the ice was strong enough to bear the machines' weight.

By this time the expedition was completely out of touch of civilisation and food was running short. The food shortage was due to the fact that the caribou had migrated south earlier than usual and the usual fish runs had stopped owing to the early freeze-up.

In the meantime information had been broadcast that the expedition was lost. Mr. W. Spence, a pilot of Dominion Explorers Ltd., was at Stony Rapids awaiting the return of the MacAlpine Expedition which was due there on Sept. 20. As soon as he received the news that the expedition was lost in the unknown North Mr. Spence, accompanied by Mr. Roy Brown, of Western Canada Airways Ltd., set out in search.

They were held up at Beverly Lake by thick fog but finally reached Baker Lake. Here they were joined by four other aircraft piloted by Messrs. Cruickshanks, Hollick-Kenyon, Vance and Mack. The last mentioned carried additional fuel and other supplies as well as skis.

A wild south-west gale then wrecked Mr. Vance's machine which belonged to Northern Aerial Minerals Exploration Ltd.

By Oct. 20 all machines were equipped with skis, but they were again delayed by severe weather. Finally four aeroplanes were able to leave for Bathurst Inlet, but after two machines had landed safely Mr. Cruickshank's machine went through the ice and the crew had to crawl out through the roof. Under very severe conditions this machine was salved by Mr. Siers, maintenance manager of Western Canada Airways, and it was this machine that eventually saved the whole party.

Three search flights were made from Burnside before an Esquimo runner brought news of the missing party.

The two MacAlpine machines had been forced to alight off Melbourne Island in the Queen Maud Gulf. From that point the eight members of the party were guided by Esquimos to Cambridge Island, the site of the nearest Hudson Bay Co.'s post.

As soon as the news was received the machines left for Cambridge Island, but they were forced down three times by fog and this fog prevented them from seeing the abandoned machines of the MacAlpine Expedition on the ice-girt Melbourne Island. They then flew from Cambridge Bay to Burnside with the rescued party.

On Nov. 12 four machines, including the repaired machine that went through the ice at Bathurst Inlet, left for Reliance. They were forced down by fog on Musk Ox Lake where they were compelled to stay two nights and a day by bad weather. Here Mr. Spence's was wrecked by hitting a snow-drift when taking off.

The passengers of this machine were transferred to the other three, and Mr. Siers and his mechanic were again called out to do repairs under Arctic conditions.

Two days later Mr. Roy Brown while flying to their aid was forced to land on Aylmer Lake. These two parties were stranded for 16 days until Mr. Cruickshanks picked them up with his machine. In the meantime Mr. Spence and Mr. Longley had made repairs to his machine with such material as he had at his disposal, such as frying-pan handles, hay-wire, etc., but when trying it out he again hit a snow bank, and this time wrote it off completely. The crew of this machine then got into Mr. Cruickshank's machine, who then flew over to Aylmer Lake, picked up Mr. Roy Brown and his crew of two, and finally reached Reliance on Nov. 28.

Two relief machines flown by Mr. Charles Sutton and Mr. Dewar had in the meantime flown up to relieve the rescue party of some of their load, and on Dec. 5 and 6 four machines, including only two of the original four relief machines, returned with the MacAlpine party to Winnipeg after it had been lost to all knowledge of the outside world for fifty-four days.

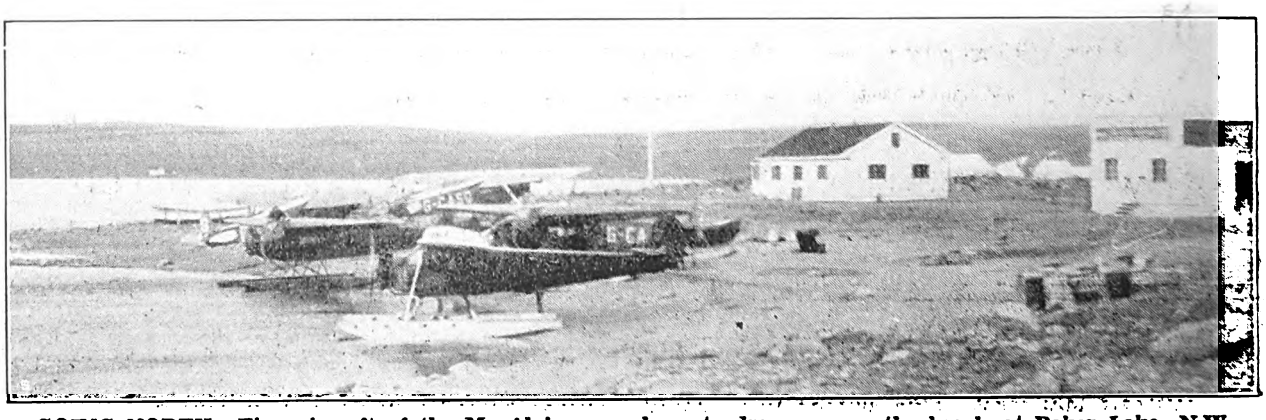
The only physical casualty of the party was Engineer Goodwin, who was left behind at Le Pas, on the way home, to have three frost-bitten toes amputated.

Every credit is due to the personnel of the rescue party. Pilots and mechanics faced all sorts of adversity in a temperature of 30 deg. below zero.

Mr. Cruickshank's Fokker Universal after breaking through rotten ice had to be raised out of sea water, the engine had to be dismantled and reassembled, and this was done so successfully that it succeeded in rescuing the missing party, and it also picked up the personnel of the other three rescuing machines which met with misfortune.

Mr. Spence's machine was repaired with frying-pan handles, etc., new skis were made out of a wireless mast, and all this was done under difficult conditions only for the machine to crash on test by hitting a snowdrift.

Little news of this epic of the North has been heard of in this country. Perhaps one may incur the displeasure of the personnel of Western Canada Airways, Dominion Explorers and N.A.M.E. Ltd. by referring to the episode as an epic. Nevertheless, to people who are unaccustomed to flying in weather other than that which is met in Great Britain such experiences as are recorded above are of a nature that commands everyone's admiration.



GOING NORTH.—Five aircraft of the MacAlpine search party drawn up on the beach at Baker Lake, N.W. Territories. On the right is a post belonging to Revillon Frères, the furriers.

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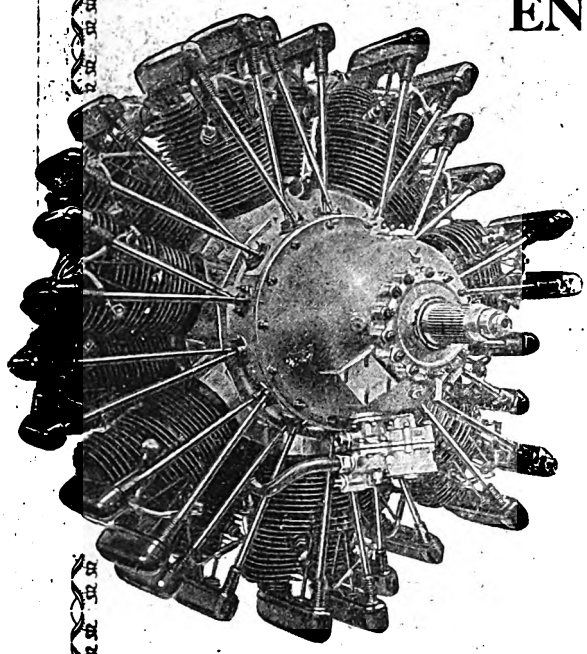
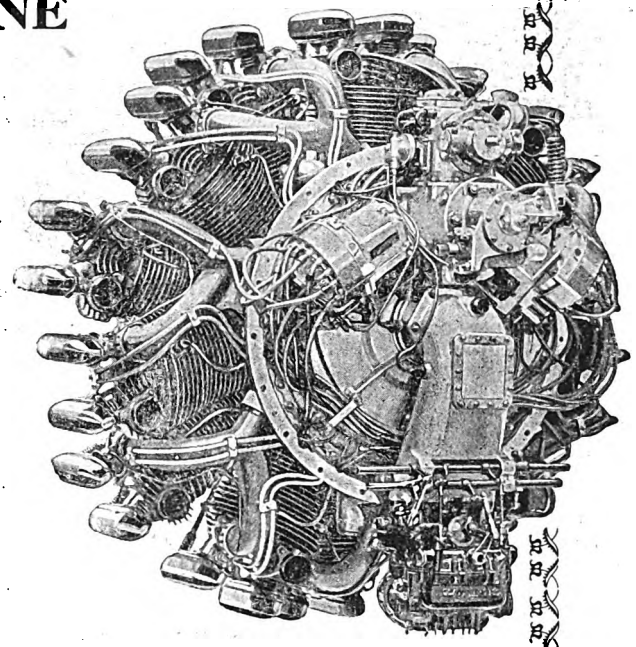
A New ARMSTRONG SIDDELEY ENGINE





OEXO

The

Jaguar Major (Geared)

THE Jaguar Major is a brilliant addition to the world-famous range of Armstrong Siddeley air-cooled engines. It is made in two types, one with geared fan rated at 525 h.p. at 3,000 feet and developing a maximum of 560 h.p. at sea level, and the other with supercharger rated at 500 h.p. at 11,500 feet and developing a maximum of 450 h p. at sea level.

The power weight ratio of these two types is 1.75 lbs. (.79 Kg.) per h.p. for the geared fan and 1.98 lbs. (.9 Kg.) per h.p for the supercharger, while the overall diameter is 46.75 in. (1.187 m).

ARMSTRONG SIDDELEY MOTORS LTD.,
COVENTRY, ENGLAND.
and 10, Old Bond St.,
London, W.1

FLOWN & KNOWN ALL OVER THE WORLD

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THE SUPERMARINE AIR-YACHT.

ASHORE.—A three-quarter view of the Supermarine Air-Yacht (three Armstrong Siddeley Jaguar engines).

The Supermarine Works of Vickers (Aviation) Ltd., have just completed a three-engined metal monoplane flying-boat which has been specially designed and built to the order of the Hon. A. E. Guinness.

For the last two seasons the Hon. A. E. Guinness has been using a Supermarine Solent flying-boat (three Armstrong Siddeley Jaguar engines) as an aerial yacht and in this machine he has made a number of cruises between England and his castle in Ireland, and over the Irish lakes.

The new Supermarine monoplane has been specially designed as an air yacht and is the first flying yacht to be built in this country to the order of a private owner. It is also the first multi-engined monoplane to be designed and built by the Supermarine Works.

The hull and superstructure are essentially of duralumin construction with the main fittings of stainless steel.

The engines are three geared Armstrong Siddeley Jaguars equipped with Townend rings and long exhaust pipes.

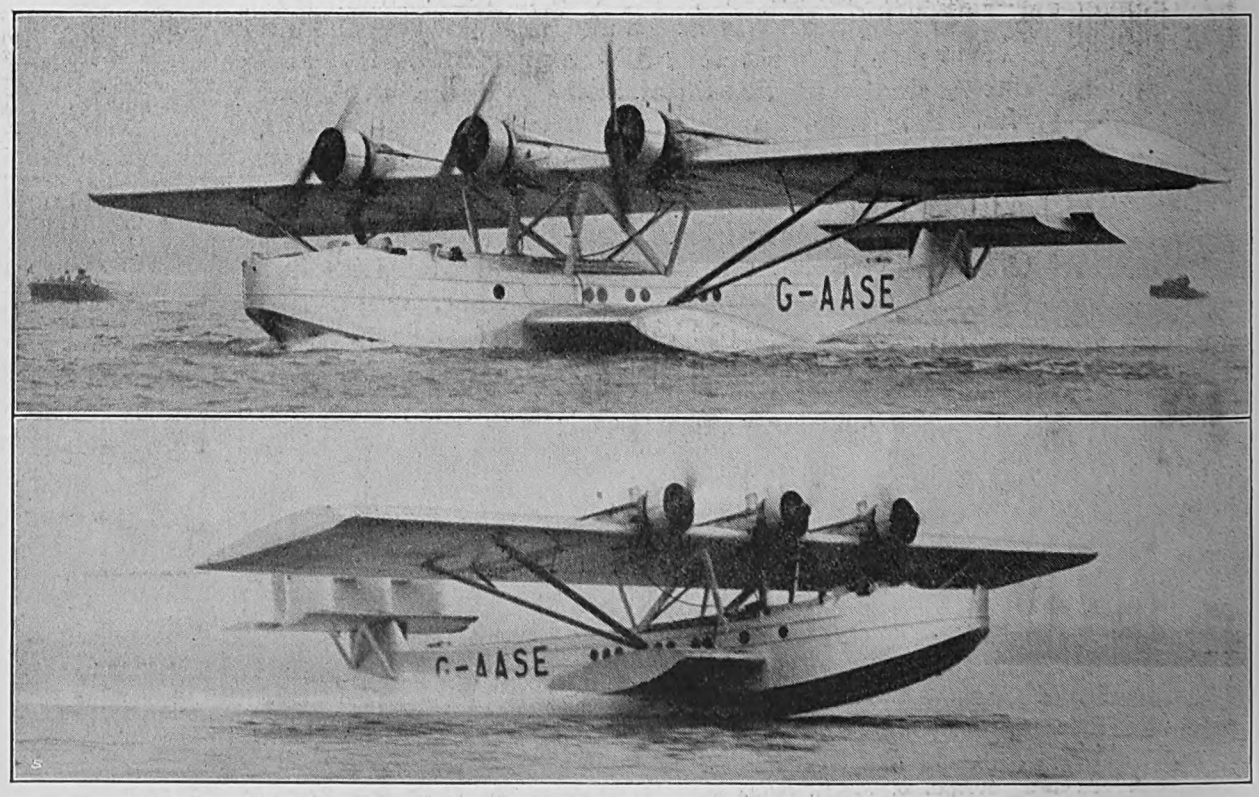
The hull, unlike previous Supermarine metal hulls, is straight-sided and it has stub floats or stabilisers of the Dornier type amidships. These stub floats contain the emergency fuel tanks. In addition they provide deck space alongside which a tender may tie-up and embark or disembark passengers. From these stubs entry to the accommodation is by companion way. When at anchor the space on these stubs is available for ordinary deck use.

In the nose of the hull is the accommodation for the crew. There are four open cockpits in pairs. The front two have side-by-side dual control and the other two cockpits which are also side-by-side are for the use of passengers. Quarters are provided in the nose with sleeping berths and ample locker room for the crew. Amidships is the owner's accommodation. This is spacious and comfortable and is provided with sideboards, dressing tables, bookcases, wardrobes, etc., in fact it is similar in every way to the usual yacht-furnishing practice. Electric light is installed and a ventilating system supplies warm or cold air at will which permits an even temperature to be maintained in any climate.

A wireless installation allows of transmitting and receiving when the machine is in flight or on the water.

Normally a crew of three, six passengers and 600 lbs. of baggage will be carried and in this condition the machine will have a range of 650 miles and will weigh 23,520 lbs. With full tanks and a minimum crew 2,000 miles can be covered without refuelling.

In preliminary tests the Air-Yacht has proved most satisfactory. The cruising speed is 100 m.p.h. and the top speed is 120 m.p.h., but it is expected that these figures will be improved on when the engines are fully tuned up.



AFLOAT.—Two views of the Supermarine Air-Yacht on its first test on Southampton Water.

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THE ROYAL AIR FORCE.

The London Gazette.

Air Ministry, February 18.

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—The following are granted S.S. comns. as Plt. Offs. on probation with effect from and with seniority of Feb. 3:—R. V. Alexander, N. H. Bantoft, J. Boston, H. M. Bowes-Lyon, H. F. Clayton-Daubeny, E. J. P. Davy, W. G. Eatherley, T. J. MacInerney, J. G. Mansfield, P. W. E. Ryland, R. M. Smith, J. B. T. Whitehead. The following are granted S.S. comns. as Plt. Offs. on probation with seniority of Feb. 3 and with effect from the dates stated:—B. E. Lowe (Feb. 5); U. Y. Shannon (Feb. 11).

Lt. E. T. Kingsford, P.W. Vols., is granted a temp. comn. as a Flg. Off. on being seconded for duty with the R.A.F. (Feb. 10); Plt. Off. on probation E. J. Finnegan is confirmed in rank (Jan. 6).

The following Plt. Offs. are promoted to the rank of Flg. Off.:—M. V. Delap (Mar. 10, 1929); J. Coverdale, K. G. Vandyck, F. K. Wood (Jan. 14); A. E. Dark, W. R. Worstall, C. B. Hughes, H. J. Pringle, J. W. Homer, R. D. Williams, C. Ryley, A. Wall, R. A. Sprague, F. P. Hewitt, J. G. Llewelyn (Jan. 28).

Group Capt. A. B. Burdett, D.S.O., is placed on the half-pay list, scale B, Feb. 4 to June 11, inclusive; Flt. Lt. C. M. E. Gifford relinquishes his S.S. comn. on completion of service (Feb. 15); Flg. Off. D. I. Stewart relinquishes his S.S. comn. on account of ill-health (Feb. 18). The S.S. comns. of the following mentioned Plt. Offs. on probation are terminated on cessation of duty:—W. E. M. Slocock (Feb. 11); R. G. Hosken, M. W. Simons, D. E. T. Whittlesea (Feb. 18).

STORES BRANCH.—The following Flg. Offs. are granted perm. comns. in this rank with effect from Jan. 10, 1929, on completion of probationary service:—R. B. Fleming, C. H. W. Boldero, A. E. Haes, J. T. Riggs. Plt. Off. on probation A. J. Howell is confirmed in rank and promoted to the rank of Flg. Off. (Jan. 10).

MEDICAL BRANCH.—Flg. Off. C. C. Fenton, M.B., B.S., B.Sc., resigns his S.S. comn. (Feb. 3).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—Flg. Off. on probation P. Bailey is confirmed in rank (Feb. 10). The notification in the *Gazette* of Jan. 17 concerning Flg. Off. R. P. D. Brailli is cancelled.

The following Flg. Offs. relinquish their comns. on completion of service:—S. T. Tipper (Jan. 17), R. V. D. White (Jan. 18).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 601 (COUNTY OF LONDON) (BOMBER) SQUADRON.—The following Plt. Off. to be Flg. Off.:—L. A. Murray (Jan. 17). No. 602 (CITY OF GLASGOW) (BOMBER) SQUADRON.—The following Plt. Off. to be Flg. Off.:—D. H. Back (Nov. 21, 1929).

Appointments.

Week ending February 24.

GENERAL DUTIES BRANCH.—Wing Commander H. G. Smart, O.B.E., D.F.C., A.F.C., to No. 99 Sqdn., Upper Heyford, to command, 5/2.

Squadron Leaders L. M. Bailey, A.F.C., to R.A.F. Depot, Uxbridge, 7/1. L. O. Keeble, to H.Q., Coastal Area, 20/1. A. P. Maurice, D.F.C., to Superintendent of R.A.F. Reserve, Hendon, 11/2. J. S. T. Fall, D.S.C., A.F.C., to Home Aircraft Depot, Henlow, 10/2.

Flight Lieutenants H. N. Hawker, to No. 111 Sqdn., Hornchurch, 7/1. G. T. Richardson, to A. and G. School, Eastchurch, 4/2. J. N. Boothman, to M.A.E.E., Felixstowe, 10/2. A. J. Elliott, to No. 22 Group H.Q., S. Farnborough, 10/2. H. M. Massey, M.C., to H.Q., Coastal Area, 12/2. J. R. Wolley, to School of Army Co-operation, Old Sarum, 1/2. J. N. D. Anderson, to R.A.F. Depot, Uxbridge, 30/1. M. H. Garnons-Williams, to R.A.F. Depot, Uxbridge, 21/1.

Flying Officers H. J. Paine, to R.A.F. Depot, Uxbridge, 10/2. G. Wood, to Station Flight, Andover, 29/1.

Pilot Officers N. R. G. Hunter, to R.A.F. Depot, Uxbridge, 26/1. G. J. C. Paul and F. J. St. G. Braithwaite, both to No. 13 Sqdn., Netheravon, 12/2. H. P. Fraser and R. Harston, both to No. 16 Sqdn., Old Sarum, 12/2. A. F. C. Booth, A. C. Watson and W. M. Rankin, to No. 26 Sqdn., Catterick, 12/2. E. A. Cooke and E. D. Bishop, to No. 7 Sqdn., Worthy Down, 12/2. R. C. A. Brooke-Beer, V. R. Moon and F. R. W. Goad, to No. 9 Sqdn., Manston, 12/2. G. H. A. Blackwood and T. W. Hoyle, to No. 10 Sqdn., Upper Heyford, 12/2. G. N. Roberts and L. E. Jarman, to No. 12 Sqdn., Andover, 12/2. C. S. Gill, T. H. Wilson and P. J. Pratt, to No. 58 Sqdn., Worthy Down, 12/2. G. E. Mustard, R. A. Davies and G. P. Marvin, to No. 99 Sqdn., Upper Heyford, 12/2. H. L. Smith, D. W. Smythe, R. E. H. Beaton and G. P. Longfield, to No. 101 Sqdn., Andover, 12/2. G. S. King, to No. 207 Sqdn., Bircham Newton, 12/2. The following Pilot Officers are posted to R.A.F. Depot, Uxbridge, on appointment to S.S. Comns., on probation, with effect from 3/2:—R. V. Alexander, N. H. Bantoft, J. Boston, H. M. Bowes-Lyon, H. F. Clayton-Daubeny, E. J. P. Davy, W. G. Eatherley, T. J. MacInerney, J. G. Mansfield, P. W. E. Ryland, R. M. Smith, J. B. T. Whitehead, B. E. Lowe, U. Y. Shannon.

MEDICAL BRANCH.—Flight Lieutenants J. B. Gregor, to Station H.Q., Upper Heyford, 5/3. O. G. J. Nicolls, to Princess Mary's Hospital, Halton, 23/3. P. H. Perkins, to Station H.Q., Andover, 25/2.

Flying Officers A. P. Atkins (Dental), to Home Aircraft Depot, Henlow, 21/2. C. M. Leckie (Dental), to H.Q., Iraq Command, 11/2.

STORES BRANCH.—Flight Lieutenants C. A. Longhurst, to Station H.Q., Kenley, 17/2. R. W. Stewart, to No. 4 Stores Depot, Ruislip, 10/2.

Flying Officers J. E. Welman, to R.A.F. Depot, Uxbridge, 15/11. F. E. R. Dixon, M.C., to No. 600 Sqdn., Hendon, 10/2. C. L. Thompson, to No. 504 Sqdn., Hucknall, 10/2. A. Amy, to R.A.F. Depot, Uxbridge, 3/1.

The Gordon Shephard Prize Awards.

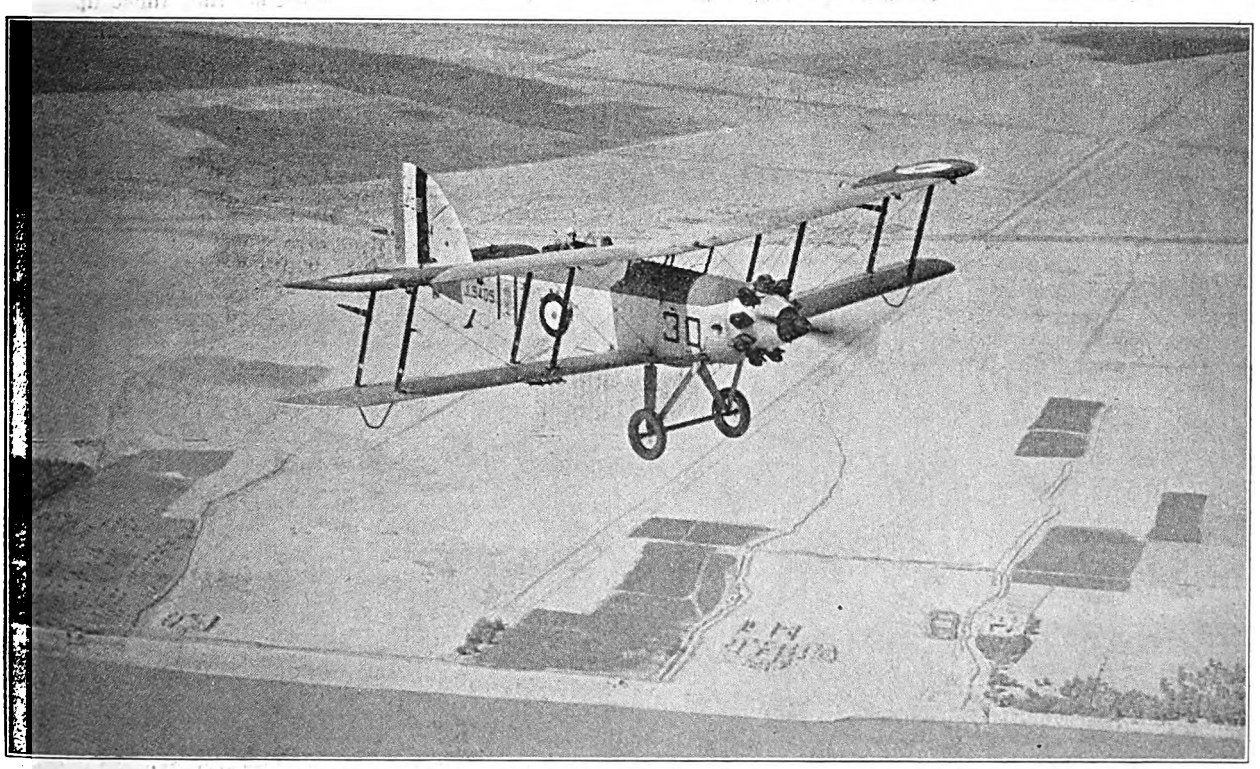
The Air Ministry announces that the Gordon Shephard Memorial Prizes, which are given annually for the best essays submitted by members of the Royal Air Force on subjects selected by the Air Council, have been awarded as follows in the 1929 competition:—

1st Prize: Wing Commander W. A. McClaughry, D.S.O., M.C., D.F.C., *p.s.a.*

2nd Prize: Group Capt. L. W. B. Rees, V.C., O.B.E., M.C., A.F.C.

3rd Prize:—Squadron Leader H. P. Lloyd, M.C., D.F.C., *p.s.a.*

The competition was established as a memorial to the late Brigadier-General G. S. Shephard, D.S.C., M.C., Royal Air Force.



"VENTRE A TERRE" (the Motto of No. 30 (B) Squadron).—A Westland Wapiti (Bristol Jupiter engine) of No. 30 (Bomber) Squadron, R.A.F., flying over the banks of the Tigris near Baghdad. No. 30 Squadron is stationed at Mosul and is commanded by Wing Cdr. H. P. Lale, D.S.O., D.F.C.

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The Koweit Raiders.

In the House of Commons on Feb. 19, in reply to a question by Mr. Malone, the Under-Secretary of State for the Colonies said that he was not aware that certain Arabs who had been in rebellion against the King of the Hedjaz and Nejd were now at Basrah. Their escape from armed pursuit by the forces of King Ibn Saud had not been facilitated by British aeroplanes and motor-cars being placed at their disposal.

Several thousand tribesmen who had rebelled against King Ibn Saud's authority had surrendered with their leaders to contingents of the British Royal Air Force in Koweit early last month. After guarantees had been obtained that they would receive humane treatment, they had been handed over to King Ibn Saud, who had expressed his deep gratitude for the assistance rendered by His Majesty's Government. A small party of tribesmen of doubtful nationality, who had previously been in association with the rebels, had surrendered to 'Iraqui Police at the end of December last. The question of the disposal of this party was now under discussion between the Governments of 'Iraq and Nejd.

Mr. Malone asked the Under-Secretary to see that none of these gentlemen went to their doom. Dr. Shiels replied that safeguards were obtained in all these cases.

Air Action in the Sudan.

Air action was taken by a flight of five machines of No. 47 (Bomber) Squadron against a section of Nuba tribesmen on Dec. 24 and 27, 1929. The tribesmen surrendered and their position was occupied by Infantry under cover of the aircraft.

The trouble began with armed resistance being offered to a police patrol which was compelled to withdraw. The District Commissioner accompanied by police and a small force of Camel Corps attacked the tribesmen and arrested the leader. On the following day the tribesmen attacked the police and troops, killed one soldier and wounded the British officer in command and one of the N.C.O.'s. They then established themselves in a strong position. Reinforcements of the Camel Corps, numbering about 300, were sent up but the tribesmen remained on the offensive. Air action was ordered to reduce the number of casualties which would have occurred if infantry action had been taken.

No. 203 (Flying-Boat) Squadron.

In the course of a cruise by two flying-boats of No. 203 (Flying-Boat) Squadron, R.A.F., from Basrah, at the end of last year, a call was made at Khor Jaramah, on the east coast of Arabia. The lagoon was found to provide a suitable anchorage for flying-boats and seaplanes all the year round.

A site for an aerodrome was also chosen at Beit el Farage the headquarters of the Muscat Levies and a good flying-boat anchorage was found at Umm al Quwain. Two sets of moorings were laid at Bahrein. One of the flying-boats was recalled to Basrah from Muscat and the other completed its journey before returning to its base.

The Far East Command.

Two flying-boats of No. 206 (Flying-Boat) Squadron, R.A.F., left Singapore on Nov. 26, 1929, to make a reconnaissance of the East Burma coast to select emergency landing places in connection with the air route from Calcutta to Singapore. Possible new sites were inspected at Basseim, Cox's Bazaar and Kyankpyu. The machines returned to Singapore on Dec. 31.

A New Flying-Boat Squadron.

According to the current Air Force List a new flying-boat Squadron is being formed at Mount Batten, Plymouth.

The Squadron is No. 209 (Flying Boat) Squadron, and its present equipment is Supermarine Southamptons.

The Auxiliary Air Force.

The three new Squadrons of the Auxiliary Air Force which are being formed in March will be numbered and stationed as follows:—

No. 604 (County of Middlesex) (Bomber) Squadron, Hendon.

No. 607 (County of Durham) (Bomber) Squadron, Ushworth.

No. 608 (North Riding) (Bomber) Squadron, Thornaby.

Transfers to the Reserve.

The following officers of the R.A.F., serving on short-service commissions become due, on the dates stated, to transfer to the Reserve or to relinquish their commissions on completion of their service on the active list:

Flight Lieutenants:—H. J. Gearing (April 1); H. T. Herring (April 3); W. F. R. Gough (April 11); S. P. George, H. R. B. Howell, F. P. Smythies (May 14); E. P. Carroll, L.R.C.P. and S. (June 1); Douglas Loughlin, M.R.C.S., L.R.C.P. (June 27).

Flying Officers:—Robert Matheson (April 22); H. V. Smith, D.C.M. (May 14); Alfred Amy (May 25).

Enlistment in 1929.

In the House of Commons on Feb. 17, in reply to a question by Mr. Hore-Belisha, the Under-Secretary of State for Air said that 6,918 effective applications for enlistment in the R.A.F. had been received from men and boys in 1929. The numbers attested had been 2,121 men and 1,194 boys.

A London University Air Squadron.

In the House of Commons on Feb. 19 Sir P. Dawson asked the Under-Secretary of State for Air whether any steps were being taken to provide an air squadron for the University of London Officers' Training Corps in a similar manner to those already existing at Oxford and Cambridge.

Mr. Montague said that he regretted that financial considerations precluded any immediate addition to the number of University air squadrons, but he would give further consideration to the proposal in due course.

The R. M. Groves Air Navigation Prize.

The following officer has been selected by the Air Council as having reached the highest standard among the R.A.F. officers who passed the Air Pilotage course at Calshot during 1929, and is awarded the R. M. Groves Air Navigation Prize of £30 together with a set of volumes:—

Flying Officer E. A. Jones.

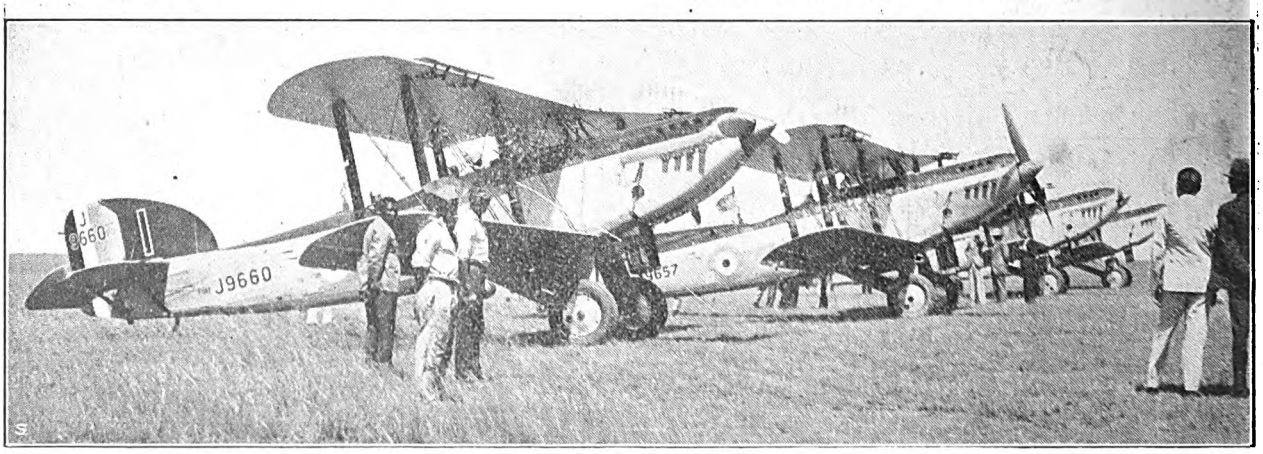
Mr. Jones was posted in October last to No. 47 (Bomber) Squadron, Khartoum.

The Accident at Kenley.

An Inquest was held at Kenley on Feb. 17 on the body of Sjt. Fell, R.A.F., who was killed on Feb. 13 in a flying accident.

Sjt. King said that he saw Sjt. Fell flying towards him in a two-seater Siskin at about 20 feet from the ground. The parachute in the rear cockpit was strapped in to the satisfaction of Sjt. Fell. Asked if the parachute could become mixed up with the controls, Sjt. King said that depended on chance.

Flt. Lt. Trench said that he saw Sjt. Fell flying round and round and thought that something was jamming his control in the back seat. The speaker flew up alongside him



SERVICE EXERCISES.—The R.A.F. Cairo—Cape Town—Cairo Flight at Bloemfontein on Jan. 30. The Flight, accompanied by a Unit of the South African Air Force, reached Heliopolis on Feb. 24, thus completing the journey according to plan.

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CIRRUS & HERMES ENGINES PRAISED

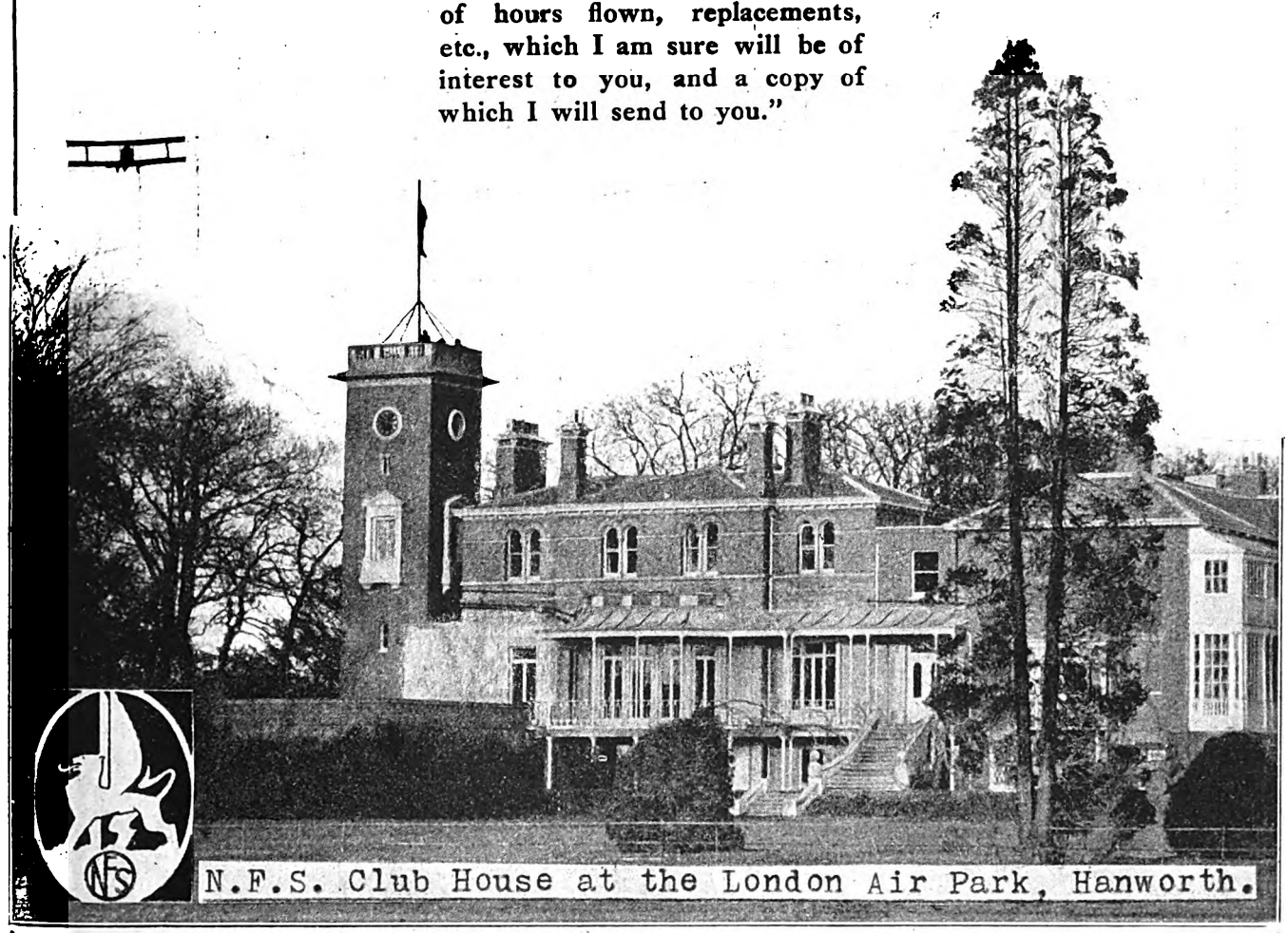
BY

NATIONAL FLYING SERVICES.

Extract from a letter dated 8th February, 1930, from Mr. G. E. F. Boyes, Deputy Managing Director, NATIONAL FLYING SERVICES, LTD.

"I should like to repeat on my behalf and on behalf of the Chief Engineer of this Company that we are very satisfied with the performance of the CIRRUS and the HERMES engines.

We are preparing a report shortly of hours flown, replacements, etc., which I am sure will be of interest to you, and a copy of which I will send to you."



N.F.S. Club House at the London Air Park, Hanworth.

CIRRUS AERO ENGINES, Ltd.,

— Regent House, —

89, KINGSWAY, LONDON, W.C.2.

Telephone: HOLBORN 4076.

Telegrams: OCIRRUSO, LONDON.

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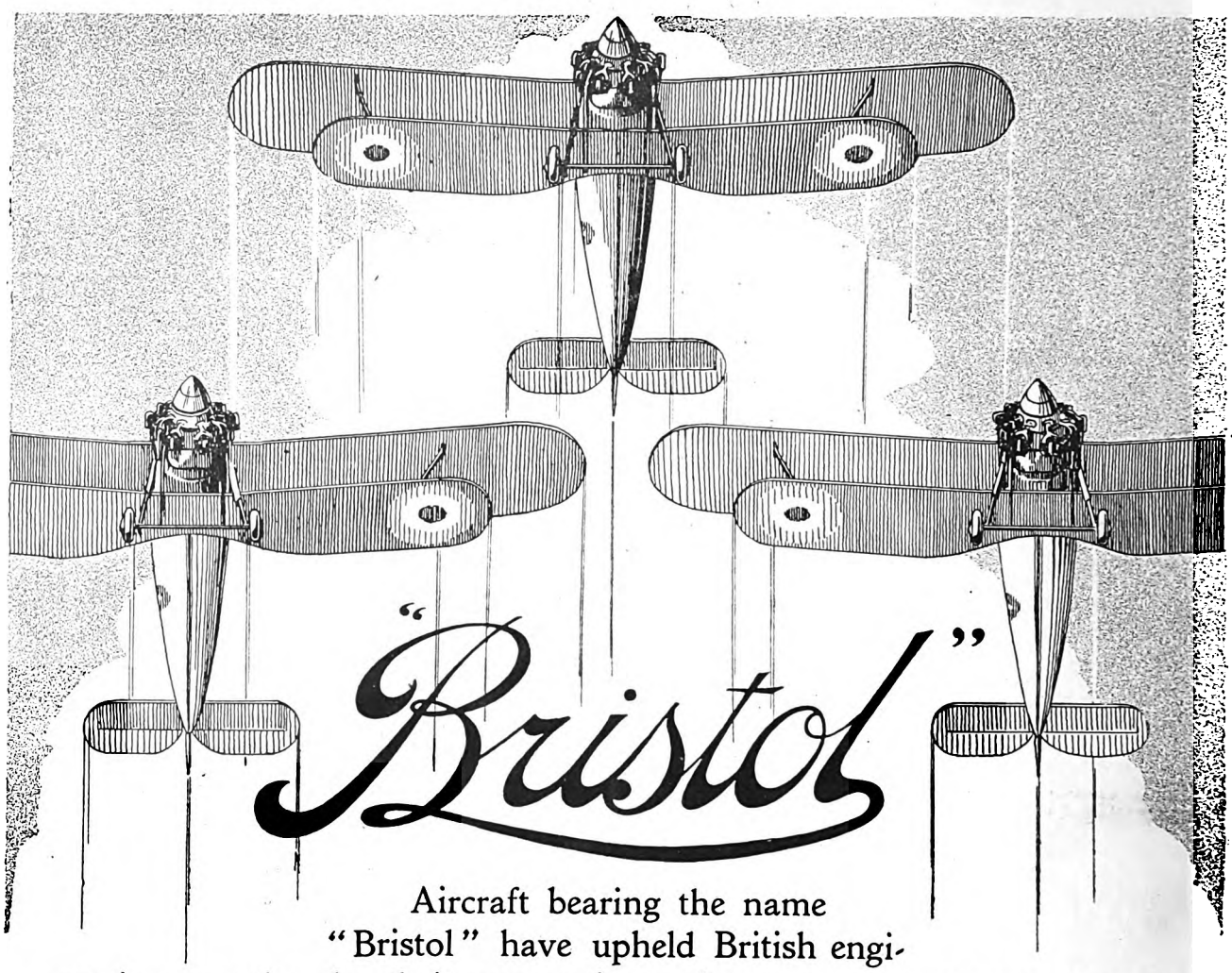

Aircraft bearing the name "Bristol" have upheld British engineering prestige, in their own sphere, for more than twenty years. In the early days of aeroplane manufacture there were but few competitors; to-day there are hundreds, and every year brings its quota of modified and new types of machines from every manufacturing country in the world. To maintain a leading position in this advance means that the whole of the technical and production departments of the firm sincerely assist the Company's policy of releasing nothing that is not as good as human skill can make it.

"Bristol" Aeroplanes are designed and manufactured by

The Bristol Aeroplane Co., Ltd., Filton, Bristol.

Telegrams: Aviation, Bristol. Flying School: Filton Aerodrome. Telephone: Bristol 3906.

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and made signs to him to perform certain evolutions which would drop the parachute out of the back seat. Sjt. Fell tried to loop but failed. Sjt. Fell finally made signs that he was going to jump and followed the speaker to a height of about 6,000 feet. Suddenly Sjt. Fell left the other machine and dived down to about 4,000 feet. Then the machine went out of control and Sjt. Fell left his machine with his parachute. Flt. Lt. Trench said that he landed and motored to the spot where the machine fell. He found that Fell had not pulled the parachute cord. The control had been jammed by something which might have been a parachute or a cap.

Dr. W. Stalker said that he thought that the strain had caused Fell to lose control of his mental faculties. That would account for his not pulling the cord of his parachute.

Summing up the Coroner said that he thought the parachute in the back seat could not have been properly strapped in.

The Jury returned a verdict of "Accidental Death."

Works Services.

The responsibility for the administration of works services at Croydon, Kidbrooke, and Lympne will be transferred from the Chief Engineer, Air Defence of Great Britain, to the Chief Engineer, Inland Area, with effect from April 1, 1930.

The Superintending Engineer, Inland Area, Southern (West Drayton), will be executively responsible. The section headquarters will remain at Kidbrooke.

Passages to Malta.

In the House of Commons on Feb. 19, Captain Balfour asked the Under-Secretary of State for Air whether he was aware that a Royal Air Force Officer on the married establishment posted to an R.A.F. Station at Malta was entitled to a Government passage for his wife and family, whereas a similarly placed R.A.F. officer posted to an aircraft-carrier, based on Malta, was not entitled to a passage for his family: and if he would state the reasons for this and consider its removal by placing those officers posted to aircraft-carriers on the same basis as officers posted to land stations at the same locality.

Mr. Montague said that the answer to the first part of the question was in the affirmative. The reason for the difference of treatment was that the tour of duty in an aircraft-carrier was of shorter duration than that at the land stations abroad, including Malta, to which passages for officers' wives and families were allowed. He regretted that he was unable to adopt the hon. and gallant member's suggestion.

The Wearing of Plain Clothes.

King's Regulations and Air Council Instructions for the R.A.F., para. 203 A and clause 2 of para. 1399 have been amended by an Air Ministry order which states:—

Permission may be given by a C.O. to (i) Warrant Officers and Flight Serjeants, and (ii) Serjeants in possession of two good-conduct badges, or in special cases those who have held commissioned rank in previous service, to dress in plain clothes while on pass.

The Abbotsinch Aerodrome, Glasgow.

In the House of Commons on Feb. 19, in reply to a question by Mr. Hardie, the Under-Secretary of State for Air said that the Air Ministry had the Abbotsinch site under consideration as an aerodrome for the Glasgow Auxiliary Air Force Squadron for some time before the Corporation had decided to provide a municipal aerodrome. At first the drainage of the site had seemed to present insuperable difficulties and this had led to a temporary abandonment of the proposal which, however, had been resumed as soon as it had been found that the difficulties could be overcome. He was afraid that Abbotsinch would have to be kept for the Auxiliary Air Force who must have an aerodrome close to Glasgow, but he saw no reason why the Corporation should not be able to find a suitable alternative site for a civil aerodrome.

Engine Exhaust Silencers.

In the House of Commons on Feb. 19, in reply to a question by Mr. Maclean, the Under-Secretary of State for Air said that a number of engine exhaust silencers were under investigation at the Royal Aircraft Establishment at Farnborough. All the designs involved the carrying of considerable extra weight and no decision had yet been reached as to the design which achieved the best compromise between weight and efficient silencing.

Too Much Money.

A Treasury Minute has been issued authorising certain surpluses on the 1928 Air Vote to be applied to meet deficits for the same year.

After applying the surpluses to meet the deficits, a net surplus of £158,064 is shown.

Rugby Football.

R.A.F. versus United Banks:—The R.A.F. beat the United Banks at Ealing on Feb. 19 by two goals and a try (13 points) to a goal and a try (8 points). The game was a fast and open one without very much skill on either side. A further re-arrangement of the back division has put Flg. Off. Llewellyn at stand-off half and Plt. Off. G. R. White and Cpl. Clements on the left wing. This arrangement did not have a fair trial because Mr. Llewellyn was injured in the first few minutes of the game and was still lame on returning in the second half. During his absence Flg. Off. Pott played in his place and Sjt. Kerby went on the wing.

The R.A.F. tries all came at the end of the game, the first by Llewellyn from a break by Cotton, the second by Pott from a fine run by White and the third by Elsmie from a scrum near the goal-line. Llewellyn converted two of the tries. The R.A.F. team were:—

Plt. Off. G. M. Ievers; Plt. Off. White, Cpl. Clements, Flg. Off. J. R. H. Pott and Flg. Off. R. D. Cotton; Flg. Off. J. G. Llewellyn and Plt. Off. Elsmie; Plt. Off. J. McKechnie, Cpl. King, Sjt. Kerby, Plt. Off. H. A. Constantine, Flg. Off. Beaumont, Sjt. Hall, L-AC. Maxwell, and Plt. Off. A. C. Wallace.

The Inter-Services Rugby Football Dance.

A limited number of tickets are available for the Inter-Services Rugby Football Dance, which will be held at the Hyde Park Hotel, Knightsbridge, on Mar. 1.

Applications from officers of the R.A.F. should be addressed to the Secretary, R.A.F. Sports Board, Air Ministry, Alexandra House, Kingsway, W.C.2, and should be accompanied by remittances at the rate of one guinea for each ticket.

The R.A.F. Sports Board.

The Secretary of the R.A.F. Sports Board, Wing Cdr. W. G. P. Young, O.B.E., is now accommodated at the Air Ministry, in Room 840, Alexandra House (Telephone Holborn 3434, Ext. 572).

Hockey.

R.A.F. versus Middlesex:—The R.A.F. beat Middlesex at Hillingdon on Feb. 19 by one goal to nil. On the R.A.F. side the forwards were not brilliant but the defence was sound. The only goal was scored within ten minutes from the end of the game by AC. F. Connell.

The R.A.F. Point-to-Point Association.

The following races have been arranged by the R.A.F. Point-to-Point Association for the 1930 Season:—

(i) *The Londonderry Cup*.—On 4th April, 1930, at Aldershot Military Meeting under National Hunt rules. Weights 12 st. 7 lb. and upwards. For horses the property of R.A.F. officers on the active list. Further details and entry forms from the Air Officer Commanding, Cranwell, or direct from the Brigade Major, 1st Cavalry Brigade, Aldershot.

(ii) *The Sutherland Cup (Novices)*.—On 5th April, 1930, at Blankney Hunt Point-to-Point Meeting at Boothby Graffoe, Lincoln. Weights 12 st. 7 lb. and upwards. For horses the property of officers on the active list of the Royal Air Force, Special Reserve or Auxiliary Air Force, or of flight cadets of the Royal Air Force College who have never won a race in any country under any rules.

(iii) *The Longcroft Cup*.—On 5th April, 1930, at Blankney Hunt Point-to-Point. Run concurrently with (ii) above. Weights 12 st. 7 lb. and upwards. For horses the property of officers or flight cadets who are serving, or who have served, at Cranwell, Grantham, Digby, or Waddington, or of past and present members of the Cranwell Hunt Club. Further details and entry forms for both the Sutherland and Longcroft Cups from the Honorary Secretary, Cranwell Hunt Club, Royal Air Force, Cranwell, Lincs.

(iv) *The Halton Cup*.—On 1st April, 1930. At Kimble near Halton. Weights 13 st. 7 lb. and upwards. For horses the property of officers on the active list of the Royal Air Force, Special Reserve and Auxiliary Air Force. Further details and entry forms from the Honorary Secretary, O.B.H. and Halton Point-to-Point Committee, Halton Camp, Bucks.

The Individual Boxing Championships.

The R.A.F. Boxing Association Individual Championships will be held at Uxbridge on Mar. 6 and 7. The Championships will be divided into two classes, (A) Officers, and (B) Airmen of the Regular Air Force. Entries in Class A are unlimited. Entries in Class B are limited to two a station at each weight.

Boxing.

R.A.F. versus Oxford University.—A team of officers of the R.A.F. beat a team from Oxford University on Feb. 21 at Henlow Camp by 7 bouts to 4 (18 points to 15). There were one or two last-minute alterations in the programme owing to illness, and the University sportingly allowed Cpl. Woods to deputise for Plt. Off. Lord M. A. Douglas-Hamilton, and AC. Slattery to deputise for Plt. Off. Calvert. The results were:—

Bantam-weight.—Plt. Off. H. G. J. Purcell (Digby) beat S. Lottienville (St. Caths.) on points. Purcell scored several times to the head in the first round but was shaken by a right lead to the jaw in the second. Lottienville was cautioned for hitting low in the final round.

Featherweight.—Flg. Off. R. Watkins (Kenley) beat C. L. Deveson (Balliol) on points. The first round was in Watkins' favour, but his blows lacked weight. In the second round he was brought to the boards for a few seconds by a straight left, and Deveson appeared to have the better of the last round also.

Light-weight.—Plt. Off. Nobleston (Netheravon) beat M. J. Bessel (St. John's), the referee stopping the fight after Bessel had been floored four times in the first round.

AC. Slattery (Henlow) beat C. J. Lonsdale (Ch. Ch.). The former

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landed heavily with both hands, and after Lonsdale had been floored three times in the first round the referee stopped the contest.

Welter-weight.—T. R. F. Cox (University) beat Plt. Off. A. H. Abbott (Netheravon) on points. Cox had rather the better of the first round, but Abbott evened up in the second. There was little to choose between them in the final round.

C. W. Rivington (New) beat Flg. Off. G. H. Loughnan (Catterick) on points. Loughnan was always at a disadvantage as regards reach and did well to evade the heavy swings of his opponent. In the final round Rivington landed a right swing to the jaw which shook Loughnan considerably.

R. Freeman (University) beat Plt. Off. Grant (Digby) on points after an excellent fight. Freeman landed to the head several times in the first round, and although Grant exhibited a useful left lead in the second and third rounds Freeman covered himself well and boxed cleverly.

Middle-weight.—Cpl. J. Woods (Henlow) beat W. Richardson (University) on points. Woods landed early with a vicious left swing but Richardson fought back gamely and forced his opponent on the ropes. In the second round Richardson landed several times to the head but failed to cover himself from Woods' swings to head and body. There were several clinches in the final round in which Woods scored heavily to the body.

Light-heavy.—Flg. Off. D. MacLean (Henlow) beat W. P. Thesiger (Magdalen) on points. MacLean boxed cleverly and scored with both hands to head and body in the first two rounds. Thesiger fought gamely but failed to cover up from MacLean's straight lefts and right swings to the head.

Plt. Off. C. R. Davies (Sealand) beat C. Knight (Ch. Ch.), the referee stopping the fight in the second round. Davies scored heavily to the head in the first round, and floored his opponent twice in the second.

Heavy-weight.—The Marquis of Graham (Ch. Ch.) beat Plt. Off. G. E. S. Williams (Digby) on points. Williams had rather the better of a round of open fighting, but in the second round his opponent landed several times to the head. There were several clinches in the final round but Lord Graham had rather the better of the open fighting and gained the verdict in a well-balanced fight.

Prizes were presented to the competitors by Air Vice-Marshal A. E. Borton, Commanding the Inland Area, R.A.F., who congratulated the University on the excellent show whicch they had put up.

CROSS-CHANNEL AIRCRAFT.

In the House of Commons on February 19, Capt. Balfour asked the Under-Secretary of State for Air the reply of the French authorities to representations by the Air Ministry on the complaints of non-compliance with regulations with regard to the reporting of cross-Channel aircraft not equipped with wireless: and whether the Air Ministry were satisfied that cause for similar complaint was likely to be lessened in the future as the result of these representations.

Mr. Montague said that as regards the first part of the question, assurances had been received that fresh instructions had been issued to the French staff concerned and the answer to the second part was therefore in the affirmative.

THE ACCIDENT TO CAPTAIN GROSVENOR.

According to a statement in *The Times* the Australian Air Accidents Investigation Committee issued on Feb. 4 its report on the accident to the Wackett Widgeon near Melbourne when Captain Hugh Grosvenor and two others were killed.

This report stated that so far as could be ascertained, there was neither engine nor structural failure. Several theories of the cause of the accident were possible, but the evidence was insufficient to justify the selection of any one.

AIR MINISTRY PHOTOGRAPHS.

The following paragraph has been extracted from the columns of our French contemporary, *Les Ailes.*

"We have recounted how the Air Ministry imposed a reproduction fee when, wishing to give the British Aviation Industry free publicity, we asked of them several photographs of the airship R.101. The Air Ministry, seller of photographs! We find this very amusing but prejudicial to British propaganda.

"The incident was brought up the other week in the House of Commons when a member protested against the official reproduction rights. Mr. Montague, the Under-Secretary for Air, defended the point of view of his Services by saying that it was the current practice. And to justify it he added that so far the reproduction fees for photographs of R.101 had reached £67."

The Air Ministry practice is to issue their copyright photographs to certain Press Agencies which copy and circulate them on a share basis with the Department. The Air Ministry charge of copyright fees is made to avoid unfair competition with photographic supply agencies.

AIRCRAFT INSTRUMENTS.

The following book has been received and will be reviewed in due course in THE AEROPLANE. Copies may be had from THE AEROPLANE Book Department, Cannon House, Pilgrim Street, E.C.4, post free, 21s. 6d.

Aircraft Instruments, by C. J. Stewart, O.B.E., F.R.Ae.S., M.I.M.E., Head of Instruments and Physics Department, Royal Aircraft Establishment, South Farnborough. 269 pages. Appendix and Index. Chapman and Hall. 21s. net.

ANOTHER NEON.

This Bondage. Commander Bernard Acworth, D.S.O., R.N. xxiv + 229 pp. John Murray. From THE AEROPLANE Book Department, Cannon House, Pilgrim Street, E.C.4. 7s. 6d.

This book has been written, so the author tells us, with the object of showing first, that there is an overruling reason that precludes aircraft, for all time, from fulfilling the exaggerated hopes and fears that aerial protagonists have excited in the minds of the lay publics of the civilised and semi-civilised world" and secondly of proferring a "challenge to sentiments and to many current views on bird life and on the so-called 'mind" of birds."

He may object to one's dealing with the last section of his book first—but the dominant note of the work is that the belief that aircraft will ever be of real use either for military or commercial purposes is nothing but a delusion. In fact the book is modelled upon Neon's "The Great Delusion," for the method of presentment is similar, particularly in the way that Commander Acworth resorts to special pleading backed by, in many cases, emasculated quotations.

The main contention of the author is that inasmuch as any type of aircraft is completely immersed in a moving medium the aircraft is really at the mercy of that medium—the wind—and this is the "overruling reason" why aircraft of any kind are for ever foredoomed to disappoint their advocates.

Like all fanatics he spoils his case by the lack of balance he displays—and he makes pontifical utterances on subjects to which whole libraries are devoted. For example he would have been wiser not to have discussed biological matters. He would have also been wiser not to give vent to such a statement as attributing this great delusion to "a powerful combination of involved and interested persons whose reputations and livelihoods are manifestly dependent" upon its sustenance—for this is tantamount to a charge of blackmail, and is also untrue.

Again such remarks as "this simply rules out of practical politics for even long-distance travel" is rather foolish. A famous engineer once said to a critic, in the presence of the present reviewer, "It is no good your demonstrating to me theoretically that this type of mechanism is unsound—because it has worked for years and worked satisfactorily—and that is the final judgment on it." So will aircraft.

Despite many failures, many of which were the result of foolishness, aircraft have shown certain definite advantages over other forms of traffic for particular duties,—and no amount of contrary argument can gainsay this. The author would have been wiser to have gained more knowledge on the recent successes of air power—in "Control without occupation." If he had done so he would not deride the work of the Royal Air Force in Iraq.

That the aeronautical community should be criticised is necessary and all to the good,—for it is very young. But the criticism should be informed. Mere sincerity is not enough—it must be free from obvious prejudice bordering on fanaticism.—S. G.

IMPORTANT DATES.

Feb. 27.—Mr. Rowledge's lecture before the Royal Aeronautical Society.

Mar. 2.—Ashwell-Cooke Challenge Cup Competition at Lympne.

Mar. 5.—Wing Cdr. T. L. Leigh-Mallory's lecture before the Royal United Service Institute.

Mar. 6.—Major F. M. Green's and Mr. H. C. H. Townend's joint lecture before the Royal Aeronautical Society.

Mar. 6 and 7.—Boxing, R.A.F. Championships at Uxbridge.

Mar. 8.—Rugby Football, R.A.F. v. Coventry at Coventry.

Mar. 8, 10.—International Gliding Congress at Darmstadt.

Mar. 10.—Herr Wronsky's lecture before the Royal Aeronautical Society.

Mar. 12.—Rugby Football, R.A.F. v. Civil Service at Halton.

Mar. 12.—Annual General Meeting of the Royal Air Force Club.

Mar. 15.—Assoc. Football, R.A.F. y. Army at Homerton.

Mar. 22.—Rugby Football, R.A.F. v. Army at Twickenham.

Mar. 26.—Annual General Meeting of the Royal Aero Club.

Mar. 27.—Inaugural Meeting of the British Gliding Association.

April 3.—M. M. P. Grimault's lecture before the Royal Aeronautical Society.

April 19.—Leicester Flying Meeting (Leicestershire Aero Club).

May 31.—Bristol Air Pageant (Bristol and Wessex Aeroplane Club). Official opening of Bristol Municipal Aerodrome.

June 9.—Northamptonshire Aero Club's meeting at Sywell.

June 10—15.—F.A.I. Conference, Paris.

June 21.—Annual Air Rallye at Haldon Aerodrome.

June 26.—Ipswich Air Pageant (Suffolk and Eastern Counties Aeroplane Club). Official opening of Ipswich Municipal Aerodrome.

June 27.—Annual Dinner, R.A.F. Dinner Club.

June 28.—Royal Air Force Display at Hendon.

July 5.—King's Cup Air Race (Royal Aero Club).

July 20—Aug. 7.—International Touring Competition.

July 26.—Norwich Flying Meeting (Norfolk and Norwich Aero Club).

Sept. 1—6.—Fifth International Congress on Air Navigation—The Hague.

Sept. 6—28.—International Aero Exhibition at Stockholm.

Sept. 20.—Liverpool Air Pageant (Liverpool and District Aero Club and Lancashire Aero Club).

Nov. 28—Dec. 14.—International Aero Exhibition at Paris.

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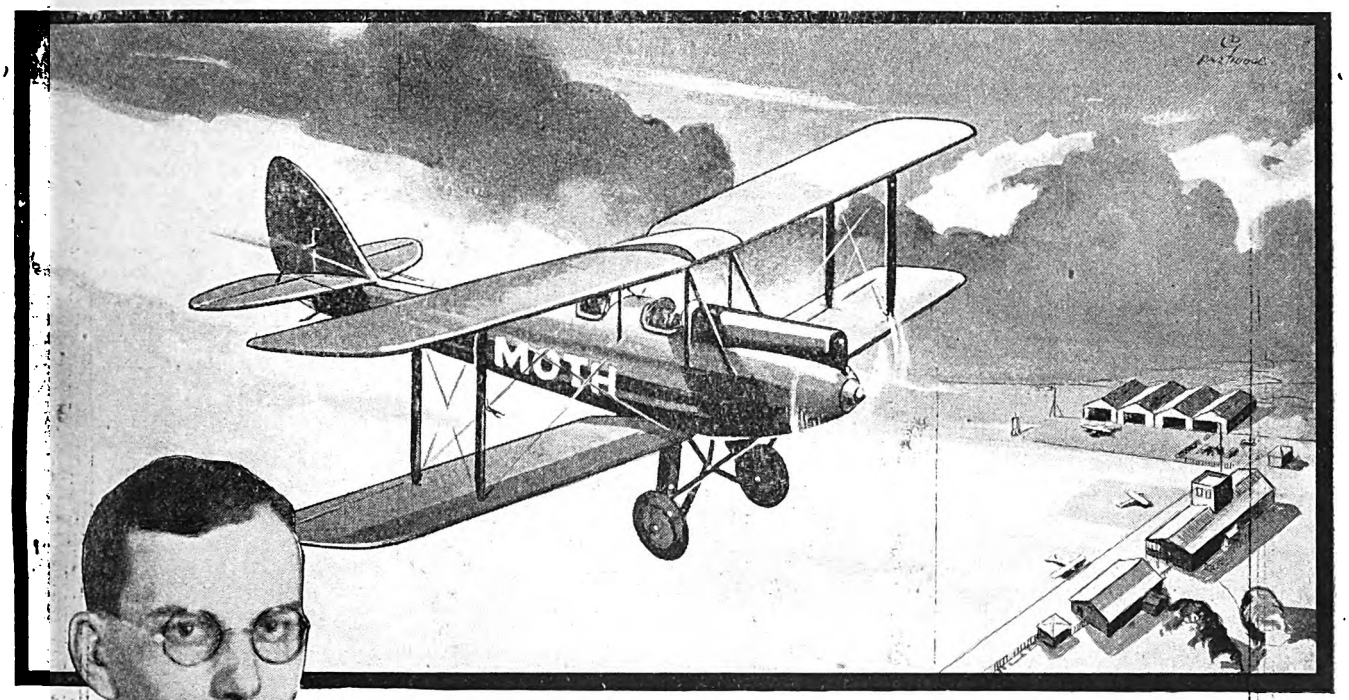

Mr. F. C. Chichester

The extraordinary ease of flying a MOTH

AMATEUR'S GREAT FLIGHT TO AUSTRALIA

Mr. F. C. Chichester, a private owner of a Gipsy Moth, left Croydon on December 20th and landed at Port Darwin, Australia, after only 17 days' flying.

The Daily Telegraph says: "Mr. Chichester's untrumpeted exploit stands out as one of the really big flights, not only as an example of pluck and determination, but also because it illustrates so convincingly the utility of the light two-seater aeroplane of 90 h.p. to 100 h.p. Mr. Chichester is not a professional airman or mechanician . . . he had not many thousands of flying hours' experience — he only became a pilot last August — and he is in every respect, except achievement, an amateur."

Such a feat ably brings home the simplicity of the Moth's control and the ease of learning to fly; and, more than this, it adds yet again to the ever-growing list of Moth's long distance flights to every corner of the Empire.

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Send for your copy of "The Book of the Moth" which tells you why you should fly . . . how and where to learn to fly, and how little it costs to fly a Moth. Price 1/8 post free.

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AERO ENGINES

Admiral Demestica and his Staff witnessing the Demonstration.

CEREMONY AT TATOI (ATHENS)

"Assisted by ideal weather the Tatoi Aerodrome was yesterday in its glory and witnessed an imposing and most successful ceremony. The six new Horsley Torpedo Bombing Aeroplanes were delivered to our Naval Air Force, the engines being the well-known Rolls-Royce 'Condors.' Whoever had the good fortune to be present at the formal delivery and demonstration of this Aircraft felt the most lively satisfaction with this addition —a very small one unfortunately—to our Naval Air Fleet.
All the officials of the Naval Air Force are unanimous in stating that they consider the Hawker Horsley Rolls-Royce to be a perfect Aircraft of this class."—From the *Eleftheron Vima*, 3rd Dec. 1929.

Mr. Botsaris, Minister of Marine, after his flight.

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AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

BALANCED AND SERVO CONTROL SURFACES.

Many reports on various control systems are available, but the results cannot be generally applied since the effect of particular changes of surface-form and mounting are subject to variations depending, among other things, upon aerofoil section and influences of machine lay-out.

If these control systems are studied in detail the general principles underlying certain developments may be understood, and it is possible for these results to be intelligently applied to machines where certain specific changes or requirements appear desirable.

The force which a pilot can exert on the control members is strictly limited and, except for very light machines, it is inadequate for satisfactory operation of the control surfaces unless the system is skilfully arranged.

The problems in connection with this work have received much attention and various means have been adopted for relieving the pilot of excess loads on the control stick and rudder bar.

In a short article of this description it is only possible to make a simple analysis of the several systems in more general use. Simplicity is a great virtue in itself, especially in rough preliminary work, but it is usual to find that the further the effort of simplification is carried the more likely does error become. Between rough approximations and full elaborate calculations there is a half-way ground which is of more general interest to the practical engineer and such work has therefore a distinct place and value.

SURFACE BALANCE.

From a mechanical point of view the elevator, rudder, and aileron surfaces can be treated in a similar manner.

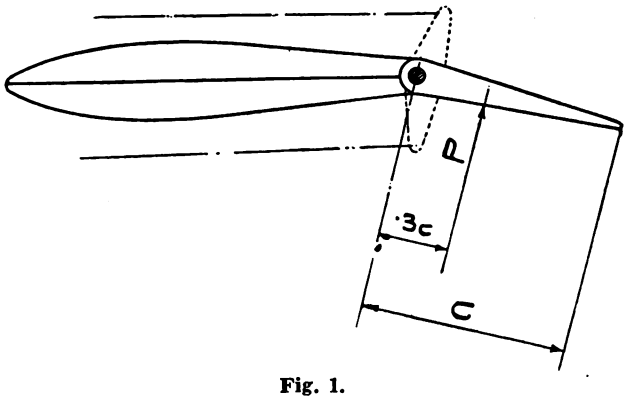

Fig. 1.

Considering a simple elevator unit such as that illustrated in Fig. 1. If an air load P is acting normal to the surface such that its C.P. lies at .3 of the chord from the hinge, then the hinge moment .3CP must be balanced by a load applied at the top of the control column.

The hinge moment on such a surface is roughly proportional to the angular movement and to (area x chord) of aileron or elevator.

It will be apparent that there is a definite limit to the load a pilot can sustain and, where the control surfaces become too heavy for the pilot's strength, assistance is provided through one of two methods: (a) Balanced Control Surfaces or (b) Servo Control Surfaces.

Servo control systems have received a limited application on machines above 10,000 lbs. gross weight, but it is usual to balance the control surfaces of all machines with the exception of very light aeroplanes.

A reduction in the control column force can be effected by increasing the aspect ratio of the surface, thereby reducing the chord and hinge moment. While this method is perfectly sound, there are very definite limitations to this procedure, especially for elevators and rudders.

Balancing of control surfaces is done by disposing the moving surface so that part projects forward of the hinge-line, and this in effect brings the C.P. of the surface nearer to the hinge and decreases the hinge moment.

In discussing the various balance systems reference will be made to Overbalancing and Underbalancing, and these terms can be simply defined. Overbalancing is that condition when the C.P. lies forward of the hinge, so that the surface tends to take charge and throw over to its extreme limit. This represents a reversal of load on the control column and is a serious fault. Underbalancing on the other hand is not a serious matter except on large machines when the control forces tend to become excessive.

A very considerable reduction in hinge moment may be required on some machines if the controls are to be balanced sufficiently to permit of reasonable loads on the operating members. This being so, it is important to know the safe limit to which balance can be carried without overbalancing under certain conditions of flight.

RUDDERS.

From an examination of the geometrical shape of most rudders, it is evident that the chord is generally much greater than that of the elevator because its height, for structural reasons, is comparatively small. The longer chord increases the hinge moment and makes for heaviness on rudder control. Chiefly for this reason rudders are more often balanced than the other control surfaces and, on large machines, some form of servo operation is required.

It is usually found that the rotational flow of the slipstream, introduced by the airscrew action, requires the use of some right or left rudder (depending on the direction of airscrew rotation) to maintain straight flight with throttle open. In this case the effectiveness of rudder balance is marked, the balance holding the rudder over without much effort on the part of the pilot. Several devices have been employed for overcoming the rudder-bar force during straight flight. One method consists of a spring (usually

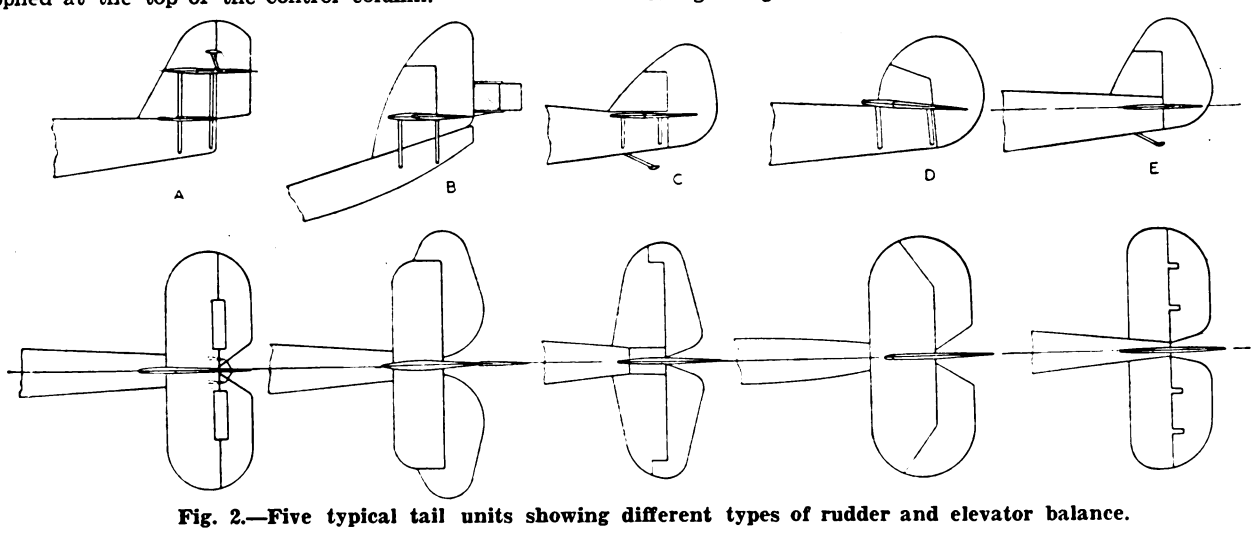

Fig. 2.—Five typical tail units showing different types of rudder and elevator balance.

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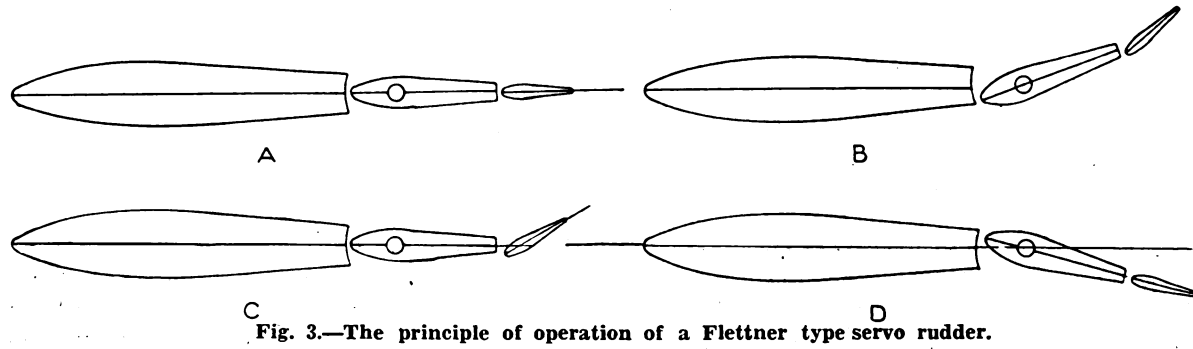

Fig. 3.—The principle of operation of a Flettner type servo rudder.

shock-absorber cord) attached to one side of the rudder-bar which produces the necessary corrective force. An alternative system which has been used with success is that of offsetting the fin.

A series of typical tail-units is shown in Fig. 2 and indicates some of the methods employed for providing rudder balance.

There is a scarcity of published information with respect to experimental work on tail-units. The reason for this is no doubt to be found in the fact that no part of the aeroplane is so easily altered and exchanged. Unfortunately the large amount of experimental work on this subject, done by individual designers and manufacturers, is never published, but the results may be found embodied in all successful machines.

The use of servo controls for aircraft have been chiefly confined to rudders. Unlike the elaborate servo mechanisms used on ships the method employed on aeroplanes is very simple and generally consists of a small auxiliary rudder mounted aft of the main rudder. Recent instances of the use of such devices are to be found in the Boulton & Paul Sidestrand, the Short Singapore and Calcutta, and the Beardmore Inflexible.

The principle of operation will be briefly outlined in conjunction with the diagrams shown in Fig. 3. The only forms of servo rudder used on aircraft have been of Flettner type, or variations of that type. This system depends upon the action of a small trailing flap carried by a balanced rudder. The main rudder is quite free to swing in any direction, the pilot only controlling the auxiliary flap. Fig. 3a shows the control unit in a neutral position, Fig. 3b shows that a disturbance has started the rudder to swing without any movement of the rudder bar, as it is free to do, and the mounting of the controls to the auxiliary flap are such that they start the flap moving in the same direction as the main rudder, but at a greater rate. This applies a corrective moment which returns the rudder assembly to its neutral position. The position at Fig. 3c indicates that the pilot has moved the rudder-bar over and rotated the flap. It is applying a turning moment to the main rudder and Fig. 3d shows the position of equilibrium following the movement at 3c. When the servo rudder is moved over, the main rudder will move through such an angle that the moment of the forces acting on the complete system about the main rudder hinge, is zero.

There is no difficulty in ensuring that the servo rudder hinge moment shall be sufficiently small to give reasonably light loads on the rudder-bar. The main difficulty is, in fact, to make the moment sufficiently large to give a reasonable feel to the control.

The aerodynamics of a simple servo rudder has been the subject of R. & M. 1105. This system consists of a rectangular rudder and servo rudder of the same span hinged to its trailing edge. The arrangement is illustrated in Fig. 4. The two graphs accompanying this Fig. show the relationship between the angle of servo rudder for different positions of the main rudder hinge when the main rudder is set over at 10 and 20 degrees. The position of the main rudder hinge is given in terms of rudder chord and represents the position of the hinge in front of the position corresponding to full balance on the main rudder. It can be seen from inspection of the graphs that the servo rudder angle required, to hold the main rudder over to a definite angle, varies comparatively little with change in size of servo rudder. It follows, therefore, that there is no advantage gained by increasing the servo rudder above a certain definite size and these tests indicate that an economical ratio for rudder area to servo area is possibly between 1 : .15 and 1 : .20.

Elevators.

Five methods for balancing elevators are shown in Fig. 2. The tail units illustrated are (A) Dornier Do.X, using Dornier balance, (B) Short Singapore with horn balance, (C) Hawker Hart with inset balance, (D) Blackburn Dart with tapered inset balance, and (E) Arrangement with Frise type balanced elevators.

The object of elevator balance is to secure a close approximation to zero hinge moment under all possible conditions but without risk of overbalance on the one hand or of inadequate provision, with unduly heavy loads, on the other.

The Dornier system, used for elevators, rudder and ailerons, is a completely new departure. In appearance it looks somewhat like the Avro balance, but its action is quite different. There is no published information regarding its efficiency in comparison with other known types, but there can be no doubt regarding its efficiency in view of its successful application to the World's largest flying boat.

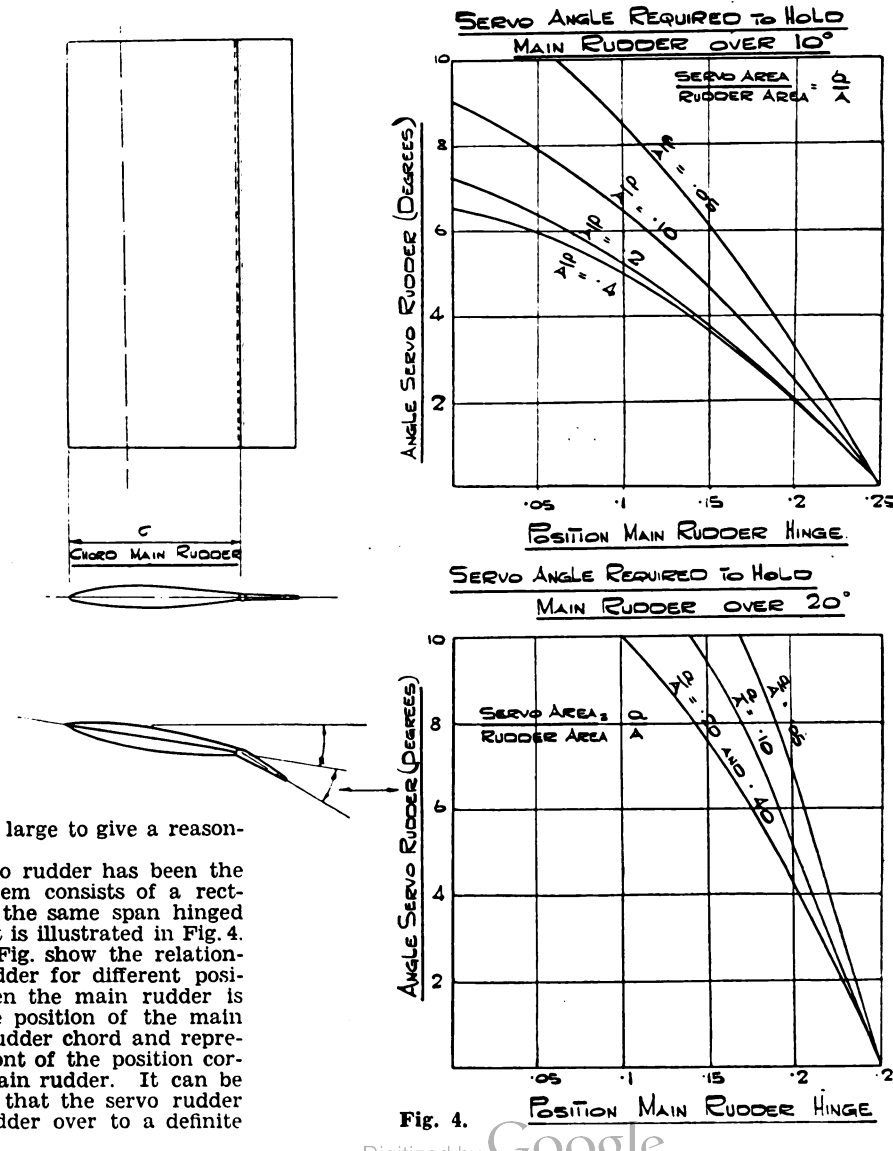

Fig. 4.

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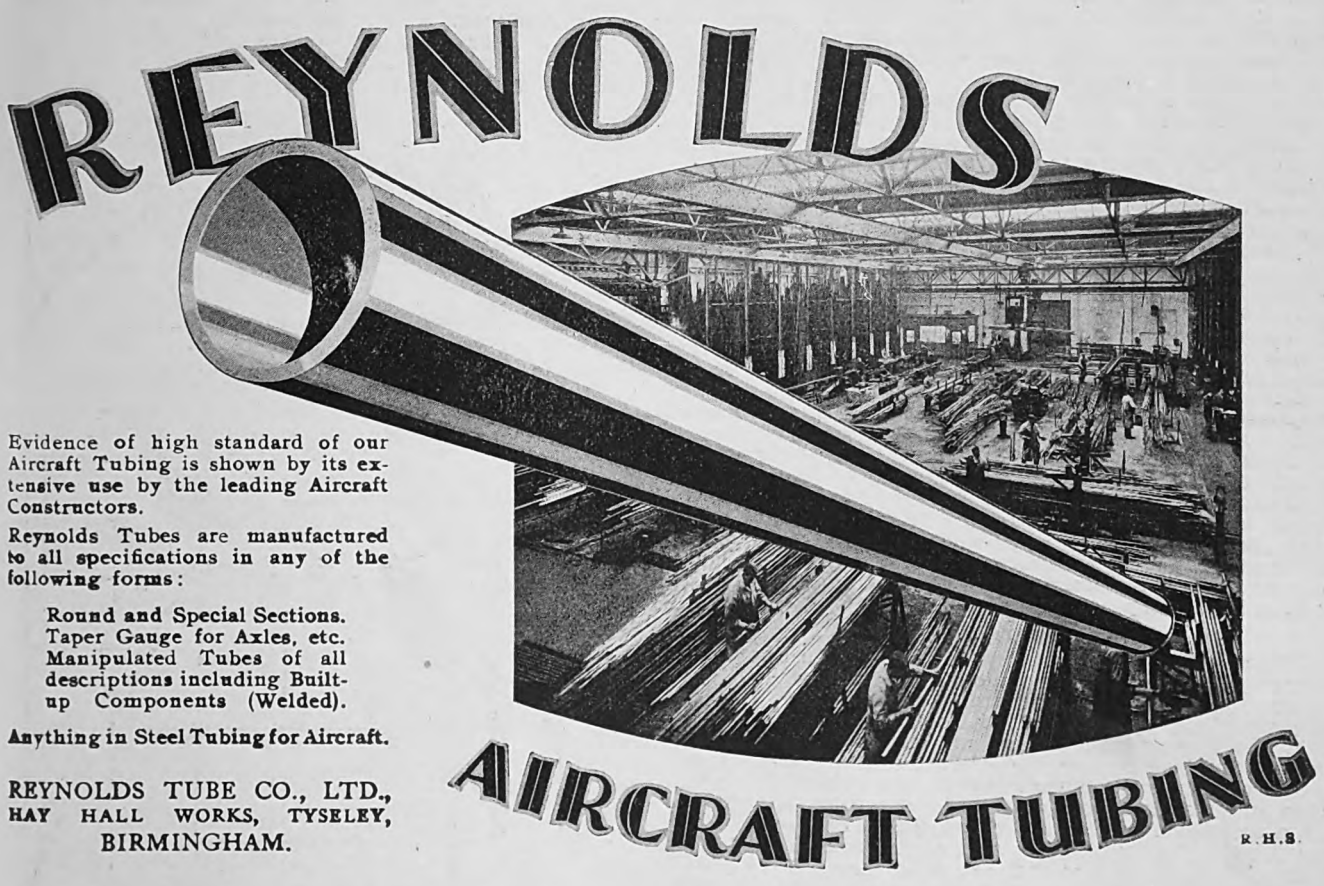

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Fig. 5 shows the method of balancing in closer detail and, it will be noted, a small balance plane is mounted on struts which are anchored to the fixed portion of the wing (or the fin in the case of rudder balance). These supporting struts are adjustable in order that the height of the balance plane can be varied. The balance is operated through a rod,

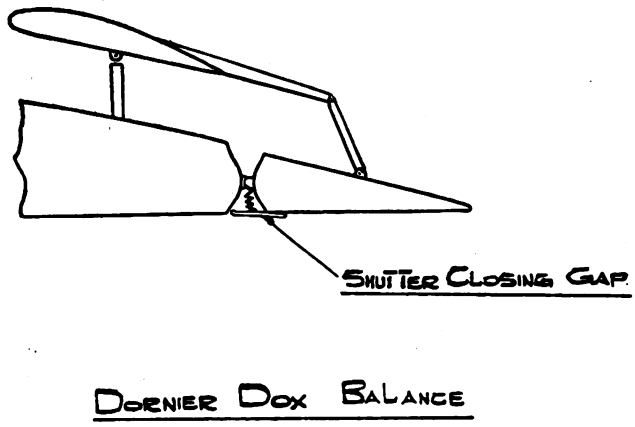

Fig. 5.

pivoted to an extension of the balance plane, and connected to the control surface at a point some distance behind the hinge.

Movement of the balance plane, following displacement of the control surface, can be readily followed without further explanation. The arrangement is ingenious since the balance plane can be easily removed, and area modified, the hinge position and incidence angle altered at will. Such advantages are not possessed by any other system. In the case of rudder control, a small balance plane is located on each side of the rudder. The controls are operated through the usual levers and torque tubes.

The Horn type of balance shown in Fig. 2 (B) is at some disadvantage at large angles of attack in that part of the elevator does not lie behind the fixed portion of the tail and forces and moments on the two moving portions can change differently and rapidly, giving rise to comparatively sudden loads in the controls. This aspect will be discussed more fully under another heading.

The types shown at (C) and (D) are in some respects similar. The chief objection to these systems is to be found when the elevator movement is such that it opens up a gap between the two parts of the tail because there is considerable loss in control power. Under similar conditions difficulties have been experienced with vibration of the elevators due to passage of air between the tail-plane and elevator. This has changed the nature of flow and the distribution of forces, causing flutter of the elevator between positions corresponding to the different types of flow. This trouble should not arise on tails with thick sections because the air flow will not pass between the gap except at extreme elevator angles.

The application of the Flettner Servo principle to ailerons has been suggested and a recent R. & M. (No. 1262) deals with this subject.

The study of different tail units, with their action and influence on controllability, is a complex matter and one which has been confined to full scale tests on few machines. In order that definite information can be obtained it is necessary for each machine to be equipped with the special apparatus necessary for the measurement of reactions and changes of attitude due to various control movements. It is found impossible to make such investigations for every machine and, in general, an easy course is adopted and the test pilot's report accepted. Modifications are carried out in accordance with such a report. It is well known that two pilots flying an identical machine may report quite differently regarding the merit of controls. Even the best reports are only statements of opinion and, as such, cannot be tabulated, compared, or analysed.

AILERONS.

When dealing with ailerons we are treading on somewhat firmer ground, for none of the other control surfaces have received so much attention from investigators and, in consequence, there is no lack of reliable data.

It has already been pointed out that high aspect ratio is an advantage because, for a given controlling effect, it serves to reduce the hinge moment. On the other hand, it is at some disadvantage as its inner portion is working at a small arm and therefore produces a correspondingly small rolling moment. For some reasons it would be desirable to place all the area at the wing tip because the aileron would then be working on a maximum arm and the size of surface could be reduced to a minimum. In fixing aspect ratio there are two extreme courses and it is usual to strike a compromise between these, as experience or conditions dictate.

It has already been stated that the object of rudder and elevator balance is to secure an approximation to zero hinge moment, but ailerons must be viewed in a different light. In this form of control there are two sets of surfaces operating differentially and the load on the control column is only that of the algebraic difference of the hinge moments on the two ailerons. It is always found desirable to leave a certain amount of "feel" for the pilot and this is generally provided in such a manner that the aileron which is "up" gives a slightly increased moment over the "down" aileron.

Reviewing various forms of aileron balance Fig. 6 illustrates three general types—Backward Hinge, Horn, and Avro. Typical hinge moment curves are shown plotted directly below the systems to which they refer. These results have been collected from various sources and, in most cases, they are not strictly comparable one with another as the tests have been made on different aerofoil sections. In the case of the Backward hinge and Avro systems a record is given of the same system without balance and the effectiveness of balance can be readily seen.

It is interesting to note that for an unbalanced surface the hinge moment is practically independent of the aerofoil angle of attack and the value of hinge moment becomes steadily greater as the aileron angle is increased.

The backward hinge system, shown in Fig. 6a, is perhaps the best type from an aerodynamic standpoint. The aileron is mounted on arms built out from the rear spar and the aileron is cut away in order that the arms, carrying the hinges, may extend some distance behind the leading edge. For conditions of perfect balance it would be desirable to mount the hinges so that the axis of rotation of the aileron coincided with its centre of pressure. Unfortunately the centre of pressure is not quite stationary and, furthermore, in practice, if too near an approach is made to complete balance, the ailerons will, under certain conditions, become overbalanced, and "take charge." This remark applies with equal force to all types of balance. When using the back set hinge balance it is usual to shape the nose in a similar manner to that indicated, to prevent any part of the aileron projecting above the wing. This shaping of the nose portion gives more uniform balance. A series of tests on a biplane with aerofoils of R.A.F. 15 section are recorded in R. & M. 651. The effect of varying the hinge position is shown in the four curves on Fig. 6a. The values of hinge moment record the net differences on the four ailerons, in other words the net moment applied to the control stick.

Setting back the hinge by .41 of the chord provides a very uniform moment but, unfortunately, it will be noted that the controls are badly overbalanced above angles of 10 degrees. For this particular arrangement, setting the hinge back .3 of the chord would seem about right and the

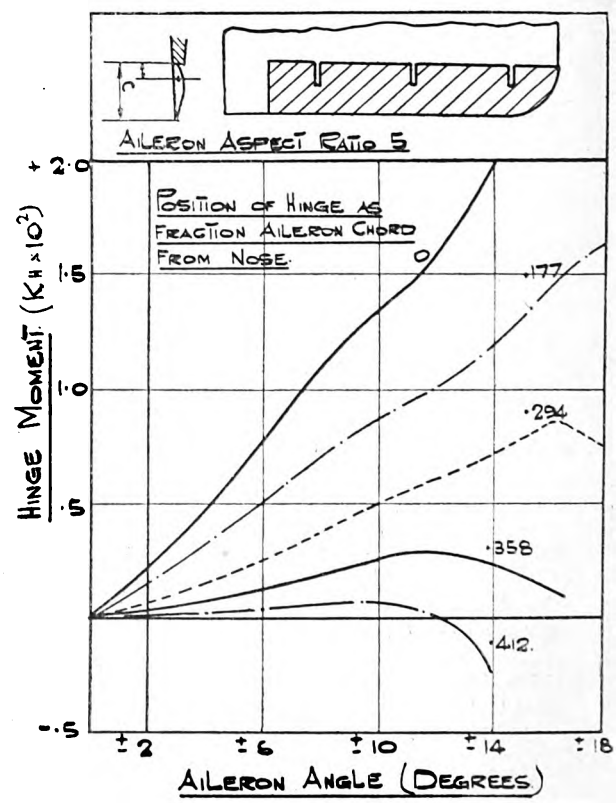

Fig. 6a.

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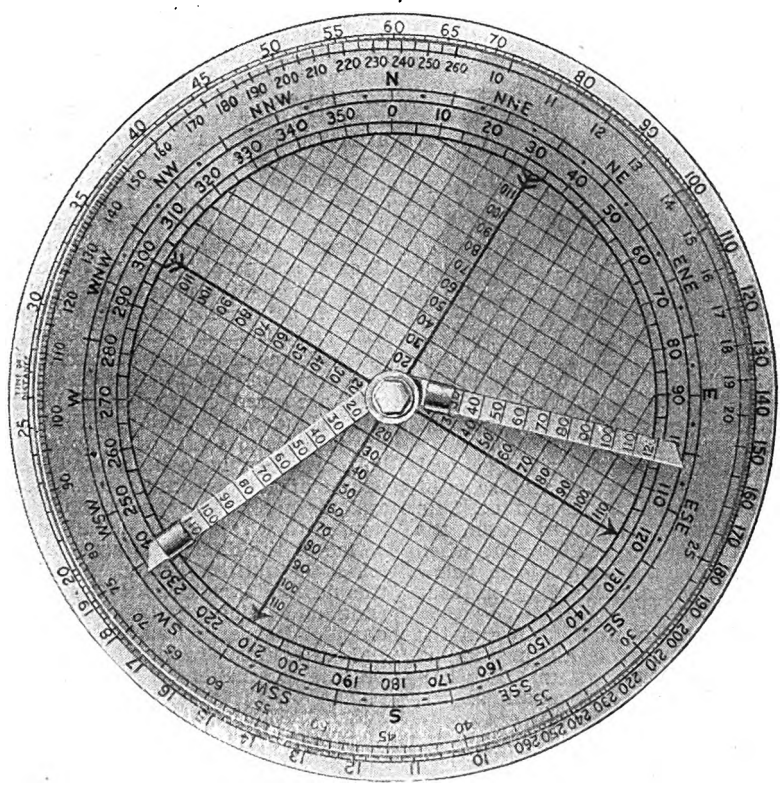

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(b) A smaller disc, marked with an arrow and divided into 10-mile squares, which can be revolved independently of the larger disc.

(c) Two radial arms pivoted at the centre of the discs, marked from 0—110 miles per hour on the same scale as the smaller disc. Each arm is identical and carries a movable pointer.

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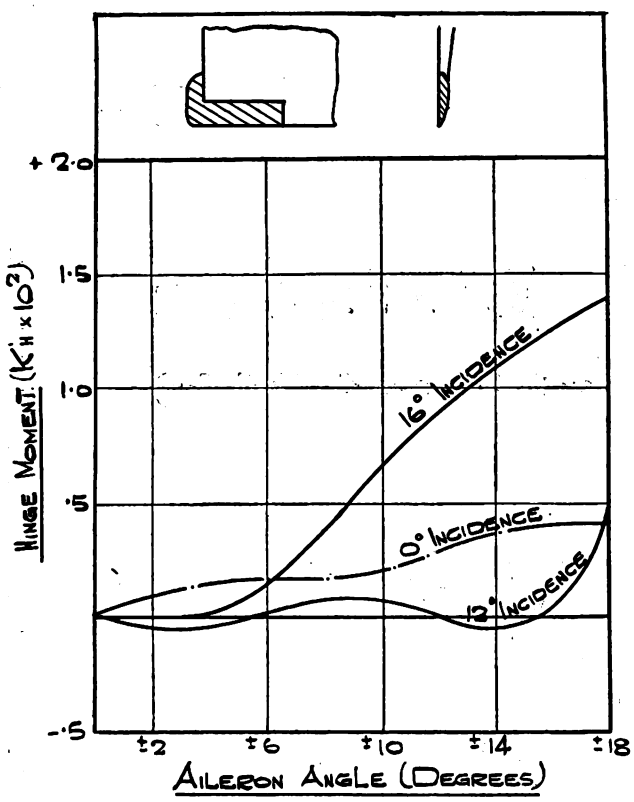

Fig. 6b.

hinge moment, for an aileron angle of 12 degrees, is about one-quarter of that for an unbalanced surface.

A development of this method, which has received general application, is the Frise aileron. The moving surface is of aerofoil form in cross-section with a flat under-surface. The aileron is mounted so that, when it is turned down, the nose remains screened behind the wing section, but when the aileron is turned up, the nose portion projects below the wing section and thereby increases the drag on that side.

The horn type of balance is shown in Fig. 6b and the hinge moment values for various aileron settings immediately reveals the disadvantages of this system. The balance, while satisfactory over a range of small angles, changes suddenly and imposes rapidly increasing loads on the control column. This system has further drawbacks in that the balance is concentrated on one side of the aileron and this introduces an offset load which necessitates a heavier structure than that used on other forms of balance. The chief advantage of this method lies in the ready way the balance area can be varied without alteration to the form or structure of the fixed portion of the wings. There is no hard and fast rule for determining the amount of balance area although it has been stated that the moment of area in front of the hinge to the moment of area behind the hinge should be approximately 1:6.

The only other balance system to which detailed reference will be made is the Avro type. In this arrangement the balance surface consists of a separate plane mounted above and forward of the hinge. From a mechanical point of view the balance effect is similar to those systems already described.

Wind-channel experiments show that the Avro balance is distinctly superior to all other systems with the exception of the back-set hinge and Frise balance. The Avro system has some constructional advantage over the Frise method in the ready manner in which the balance can be removed and varied. The additional plane adds to the parasitic resistance and one authority states that the increase in resistance is of the order of 5 per cent. of the total wing drag. This increased drag together with the uncleanliness that such a scheme presents are possibly the reasons why the system has not been extensively employed. Hinge moment curves for this system are shown in Fig. 6c for 16 and 0 degrees incidence of the main planes. The value of balanced area to actual aileron area shows wide variations, a mean ratio being of the order 1:10.

As so much depends on the nature of flow over the aerofoil, balanced conditions are particularly liable to change with alterations in form and thickness of the aerofoil used.

The forms of control discussed in this article do not cover the whole of the systems in use. Controllers of original type are used on the Hill Pterodactyl and the Glenny and Henderson Gadfly. Floating ailerons, attached to the interplane struts of a biplane midway between top and bottom wings, have been used with some success. Definite figures of the performance and comparative merits of these systems are not available, and their application has been limited to a few experimental machines only.

One of the difficulties associated with the development of full-scale control surfaces from wind channel tests lies in the flexible structure of the wings. In some instances a wing and aileron which has proved stable in the wind-channel has exhibited flutter tendencies when subject to full-scale tests. In view of these dangers it is not usual to provide the maximum balance indicated from wind-channel tests.

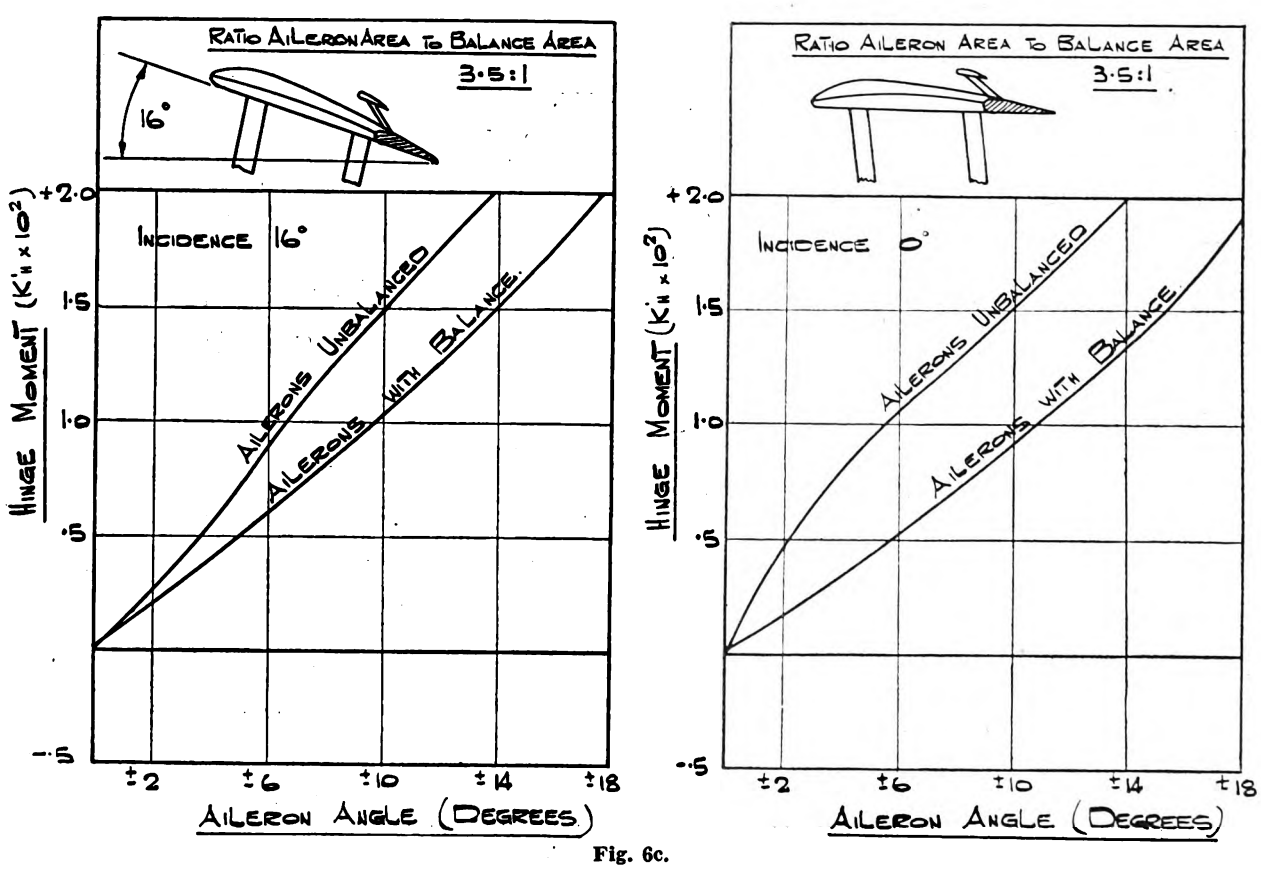

Fig. 6c.

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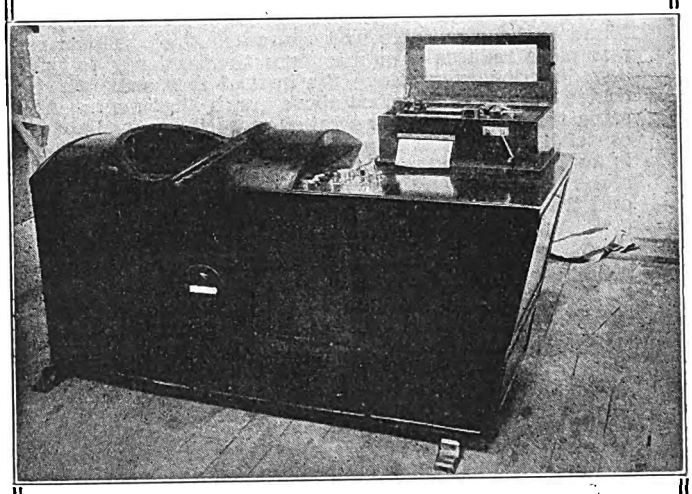

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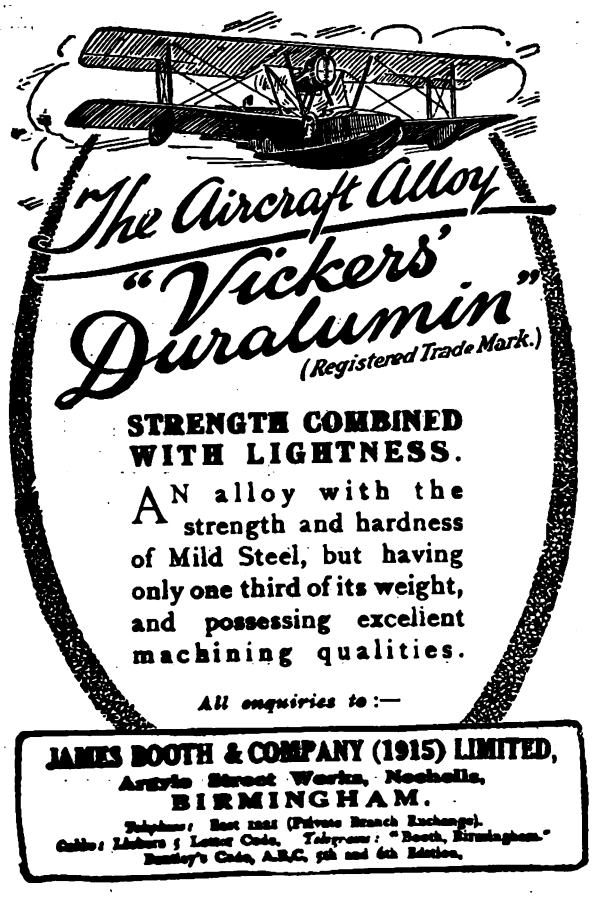

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METHODS EMPLOYED IN THE MECHANICAL TESTING OF AERO STEEL STRIP.

[BY ERNEST SKERRY, *Superintendent, Testing Dept., Kayser, Ellison and Co. Ltd., Sheffield.*]

A sentence in one of the recent Air Ministry specifications which reads—"Proof Stress determinations shall be carried out by any approved method" might be construed as a recognition of the difficulties met with in testing steel strip.

The method which commends itself is one that gives accurate readings quickly, without the employment of elaborate apparatus. Elaborate apparatus is interesting from the purely scientific point of view, but it necessarily prolongs the time taken in conducting the test.

THE TEST PIECE.

The provision of a suitable test piece is a primary consideration and there are several points bearing on its suitability.

The greatest difficulty perhaps in testing strip is to prevent the test piece slipping in the grips of the testing machine when any appreciable load is applied.

Another important point is the width of the test piece. The tendency of a wide test piece is to pull in some direction other than along the neutral axis. This direction is often along one side of the piece, and sometimes even diagonal, with the result that the test piece is buckled, and the extension readings are, of course, useless.

These dangers then must be eliminated, and the test piece must be designed with this in view.

The grips of the testing machine, which, to ensure greater accuracy should be axial-loading, are provided in the case of the left-hand grips with two hardened steel pegs, one above the other, and in the case of the right-hand grips holes are drilled so that the pegs fit in when the grips are closed. This applies of course to top and bottom. Corresponding holes are drilled in the test piece so that when it is placed in the machine and the grips close the pegs pass through and fit into the holes in the right-hand grips, thus eliminating any tendency to slip.

In regard to the width of the test piece, this should be narrowed down as far as practicable, and .25 in. has been found to be a suitable and convenient size. This narrow test piece reduces to a minimum the tendency to pull in any direction exept along the neutral axis, with which, of course, the holes described above are in alignment. At the same time it gives the operator an easily controllable test, especially if the test is made on a machine where the load is applied by hand, and this is made possible by the small sectional area. The test piece can easily be "flyed" out, and the holes drilled out afterwards.

THE EXTENSOMETER.

The elaboration previously alluded to generally comes into prominence in the selection of the Extensometer, the result of which is usually to defeat its own object.

The simple spring gauge and the attachments shown in Fig. 1 can, after some practice, be fitted to the test piece in a few seconds.

The gauge is placed in position so that the test piece fits into the groove of the attachment which is screwed onto the gauge. The part of the attachment containing the screw is then slotted in and the screw tightened. The other attachment is fixed at the top of the test piece and is moved down so that the plunger of the gauge is depressed, until the pointer is at zero.

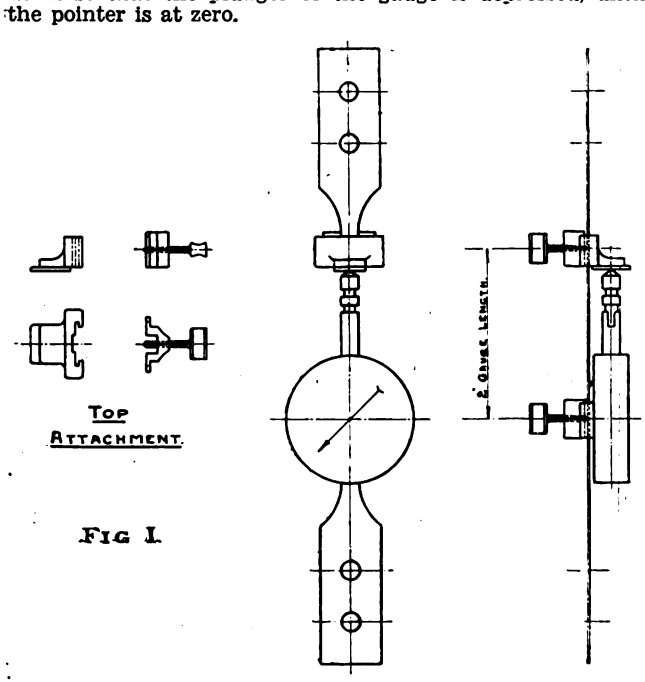
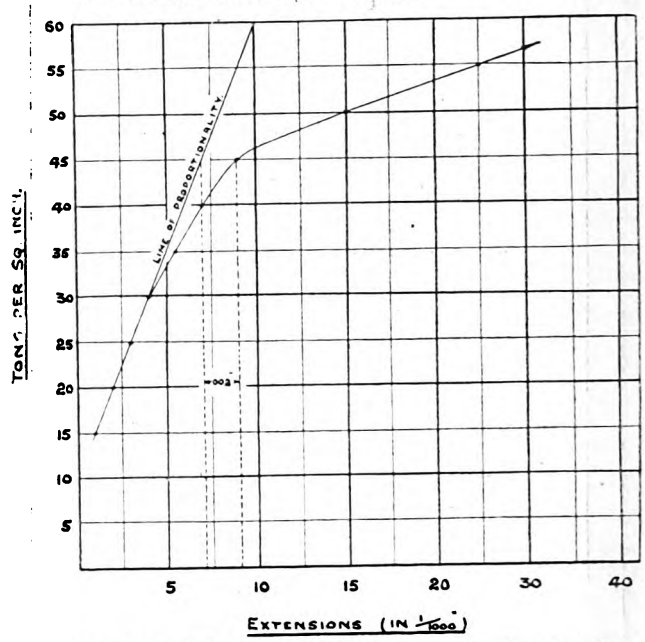


FIG I.

The extensometer is now in position, so that when load is applied and the beam of the machine is balanced, the extension of the test piece releases the plunger and the extension in thousandths of an inch is registered by the pointer on the dial.

THE PROOF STRESS AND STRESS-STRAIN DIAGRAM.

The Proof Stress is defined as the greatest load per square inch which, when applied for 15 seconds, and removed, produces a permanent extension of not more than 0.1% of the gauge length. It is in effect the Elastic Limit plus a constant, and was evolved in order to provide a practicable means of arriving at the Elastic Limit.



Taking D.T.D.100 specification as an example, the Proof Stress specified is between 40 and 50 tons per square inch. The Proof Stress can be determined within that range by taking extension readings at each load. These readings are calculated from the formula $-x = fl/E$ when

x = the extension,
f = the load (in tons per square inch),
l = the gauge length, and
E = Young's Modulus of Elasticity (12,500 tons per sq. inch).

(It has been the writer's experience that a 2-in. gauge length is more practicable than the usual 4-in. gauge length, and it will be noticed that this figure is used in the calculations.)

The extension of 40 tons $= 40 \times 2/12{,}500 = .0064$ in.
.0064 in. + 0.1% of the gauge length (.002 in.) = .0084 in.
The extension at 50 tons $= 50 \times 2/12{,}500 \times .008$ in.
.008 in. + 0.1% of the gauge length (.002 in.) = .010 in.

Providing then that the extension at 40 tons is not more than .0084 in. and the extension at 50 tons is not less than .010 in. the Proof Stress lies at some point between the two.

It has, however, been found impracticable to take readings from zero as the test piece, being usually of fairly thin section, does not take up the load until an appreciable amount has been applied. It is advisable therefore to modify the method of taking extension readings to overcome this difficulty.

A method which has been found quite satisfactory in practice is to take the readings on the last 10 tons, from 30 to 40 and from 40 to 50. The extension for 10 tons

$= 10 \times 2/12{,}500 = .0016$ in.
.0016 in. + .002 in. = .0036 in.

So that if the Proof Stress is between 40 and 50 the reading at 40 should be not more than .0036 in. and not less than this figure at 50. There is no reason why the constant should not be added for any range of extensions, as it does not in any way influence the result.

This method is very similar to that employed in specification G.E.100. This specifies a Proof Stress of 40 tons per square inch minimum and defines the Proof Stress as "the load that produces a total extension .002 in. greater per inch of gauge length than the extension produced by a tensile stress of 30 tons per square inch."

The extension calculation is as follows:—

$10 \times 1/12{,}500 = .0008$ in.
.0008 in. + 0.1% of the gauge length (.001 in.) = .0018 in. (approx. .002 in.).

(The gauge length is of course 1 in. for the purpose of this calculation.)

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With a 2-in. gauge length the Proof Stress would be that load which produced an extension of .002 in. × 2 = .004 in. after the load of 30 tons per square inch had been applied.

On each cast of steel (vide D.T.D.100 specification) the Proof Stress "shall be obtained from an accurately determined Stress-Strain Diagram, the Proof Stress being defined as that stress at which the stress-strain curve departs by 0.1% of the gauge length from the straight line of proportionality."

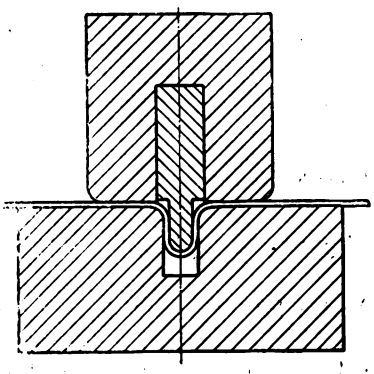

FIG 2.

Readings are taken at every five tons beginning as soon as the conditions of the test will allow. The extension obtained is plotted against the load applied, and until the limit of proportionality is reached, an almost straight line is obtained.

Immediately after the Elastic Limit has been reached the curve leaves the line of proportionality and the Proof Stress (the gauge length being 2 in.) is that stress where the curve leaves the line of proportionality by .002 in. This is illustrated in the stress-strain diagram on the previous page.

The test piece is then broken in tension, and the Maximum Stress recorded.

THE BEND TEST.

The most important thing in applying the bend test is to eliminate the personal element. The presence of this factor, which may come into the test quite innocently, is against the best interests of all concerned.

Obviously if this factor is allowed to influence, or even control, the test it is very unlikely that two operators will exert exactly the same amount of influence.

There are so many different methods and machines designed to conduct this test that it is difficult even to classify them. There are, however, two distinct types and these are shown in Figs. 2 and 3.

In Fig. 2 no allowance has apparently been made for tolerance on the strip. Should the strip be thicker than the nominal size, and one can hardly provide blocks for every conceivable thickness of strip, the action of the plunger on pressing the test piece into the block may cause the strip to seize on the sides and set up stresses which would make the test an unfair one. On the other hand should the strip be thinner than the nominal size it will probably not receive sufficient stress to make the test a correct one.

A rather obvious fault in this bend test arrangement is that on applying the test, the piece may, due to some cause, move away from the plunger and form a "V" instead of bending to the correct radius. It is here that the remarks regarding the personal element apply. One operator might by skilfully applying the test prevent this occurrence. Another might test the same strip with disastrous results.

It was with a view to correcting these errors that the machine illustrated in Fig. 3 was designed.

The block "A" holding the bend plate "B" (which has the same functions as the plunger in Fig. 2) a number of which are provided for the appropriate radius over which the strip is to be tested, is arranged to move backwards and forwards to allow the test piece to be taken out or put in. Opposite this is fixed a stationary block "C" which holds what may be called a back plate "D." This plate is the thickness of the bend plate plus twice the thickness of the strip to be tested, and a number of these are provided as in the case of the bend plates. This provision allows the jaws "E," which will be seen in the drawing, to move inwards to the back plate so that when the test is applied by moving the jaws forward the strip is bent exactly over the radius of the bend plate.

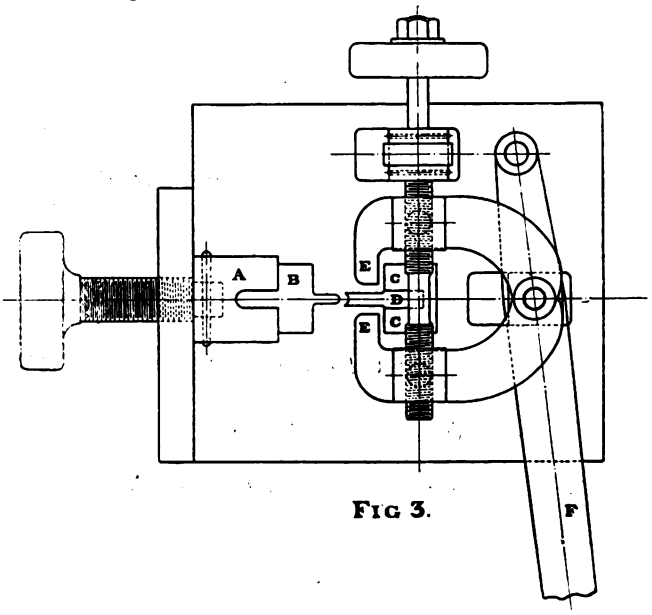

FIG 3.

The order of the test is as follows:—The lever "F" is moved backwards to its full extent and the strip to be tested is then placed between the bend plate and the back plate. The bend plate is screwed forward so that the strip is pressed fairly tightly against the back plate to provide against kinking. The jaws are then moved inwards so that they are up to the back plate, and may be adjusted to allow for tolerance on the strip. Finally the lever "F" controlling the forward and backward movement of the jaws is moved forward until the jaws are stopped by the base of the bend plate, thus applying the necessary tension.

THE CORROSION OF DURALUMIN.

Facts of importance to the Aircraft Industry, and especially to those who are interested in the building of light-metal aircraft, are given in a publication of the American Institute of Mining and Metallurgical Engineers.*

There seems to be a growing opinion in the United States that, to date, there exists no practicable method of preventing the corrosion, intercrystalline corrosion being the most serious form, of duralumin parts used in aircraft construction.

It would be extremely interesting if the Junkers, Dornier, Rohrbach companies and other classic upholders of the aluminium alloy could produce figures to prove otherwise. A line has been operating for seven years in Colombia using Junkers and Dornier aircraft. Operating conditions in such territory must have been quite as severe as anything with which the United States Forces have to contend. Therefore it would be instructive to compare figures and results and to see whether they support or controvert the American position. A very large number of Moths using duralumin floats must now be operating all over the World. The De Havilland and Short companies should be amassing some informative figures.

The method employed in the American test was to expose full size tension bars to the elements in three different localities: the Naval Air Station, Coco Solo, Panama Canal Zone; the Naval Air Station, Hampton Roads, Va.; and the Bureau of Standards, Washington, D.C. After a definite period these specimens were removed for testing. Their tensile properties were ascertained and an examination of the microstructure was made to determine the amount of intercrystalline corrosion. It was realised, however, that this procedure did not sufficiently resemble actual operating conditions and therefore means are being devised to expose specimens to corrosive influences while the specimens themselves are under either simple tension or repeated flexural stress.

Mr. Rawdon asserts that the lack of permanence or embrittlement of sheet duralumin observed in service is due almost entirely to corrosion, and almost entirely to intercrystalline corrosion. Such corrosion is greatly accelerated by a marine atmosphere and by a tropical climate.

Variations in the composition of duralumin which do not differ widely from normal composition do not materially affect the resistance of the metal to corrosion. The alloys having the highest copper content appear to be the most susceptible to attack. Variations in the heat-treatment are the most important factors in affecting corrosion resistance.

Like other American writers on this subject Mr. Rawdon holds no brief for surface oxidisation and states that "anodic" treatment has no lasting protective value unless well greased and to be effective the greasing must be constantly renewed.

The only protective coat that appeared to be effective is pure aluminum and in this way "Alclad" is highly commended.

* *Correlation of Laboratory Corrosion Tests with Service: Weather-exposure tests of sheet duralumin by Henry S. Rawdon. Technical Publication No. 173. The Amer. Inst. of Min. and Metall. Eng.*

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THE LIGHT AEROPLANE
AND THE FLYING CLUBS.

DE HAVILLAND EXPANSION IN SOUTH AFRICA.

The Johannesburg correspondent of *The Times* states that Mr. F. E. N. St. Barbe, business manager of the De Havilland Aircraft Company, who is at present on a visit to the Union, has made arrangements with three Johannesburg pilots, Major Haggie, Captain Douglas, and Captain Halse, for the formation of a company to be known as Aeros Proprietary Limited. This company will represent the De Havilland Company in South Africa and handle its products. The territory to be covered by the new company includes the Union of South Africa, the British protectorates, Northern and Southern Rhodesia, and, under special conditions, Portuguese East Africa.

ENGLAND—AUSTRALIA.

THE AEROPLANE for Feb. 19 reported the landing of Flg. Offs. H. L. Piper and C. Kay, R.A.F., in the Desoutter cabin monoplane (Cirrus-Hermes engine), at Amman, Trans-Jordan. On Feb. 8 they arrived at Jask from Basrah.

On Feb. 21 they reached Karachi, and on Feb. 24 they arrived at Allahabad.

On Feb. 24 they reached Calcutta and left on the same day for Akyab, where they arrived later in the day.

EUROPE—EGYPT.

On Jan. 28 Mahmoud Sidky Effendi arrived at Cairo in a Klemm monoplane (40 h.p. Salmson engine) from Berlin. By the successful completion of the flight he won a prize of £500 for being the first Egyptian to fly from Europe to Egypt. He was received in Cairo with tremendous enthusiasm and it is now understood that his machine has been bought by King Fuad, presumably as a museum piece and not as a royal vehicle.

A FLYING MATINEE.

The Brooklands School of Flying is giving a party at Brooklands on Sunday next, Mar. 2. All private owners in the country are being invited so that a big and representative gathering of personalities and aircraft is assured.

Flying exhibitions will begin at 14.30 hrs. Mr. Hubert Broad will give an aerobatic performance and there will be bombing contests, and a parachute descent, by Mr. John Tranum. Flying will continue until dusk.

THE HAMPSHIRE AEROPLANE CLUB.

The Hampshire Aeroplane Club has shown steady progress in 1929. At the end of the year there were 438 members on the books, as against 400 at the end of 1928. 120 new members joined, but, as always happens, some members resigned on leaving the district, etc.

The total hours flown were 1,674, which was an increase of 106 on the previous year. Dual flying went up from 720 hours to 800 hours. 37 members took their "A" Licences, as against 26 in 1928.

In April the Simmonds Spartan, with a Cirrus Mark III engine, was bought and in August a Gipsy-Moth was got largely by subscriptions from Club members. One of the original Moths was sold. There are now four machines in operation, a Gipsy-Moth, a Cirrus-Moth, an Avian and a Spartan, and an early addition to the flying stock will be made; one member has already promised £50 towards this provided that a similar amount is raised.

During the Spring the Club arranged two broadcast talks on flying from the Bournemouth station, the first by a Vice-President, Lady Bailey, and the second by the Club's first *ab initio* woman pilot, Miss A. B. Grace.

On July 5 the Club undertook the organisation of the Hamble Control for the King's Cup Race. And for the Schneider Trophy Contest in September the aerodrome was handed over to the Aviation Department of the Automobile Association for the parking of visiting aircraft, and Club members were thereby enabled to view the Contest from a steamer.

Flt. Lt. F. A. Swoffer, the Chief Instructor, left to join Wilson Airways in Kenya at the end of August. Before leaving he had the satisfaction of knowing that, with the assistance of Mr. W. H. Dudley, the whole of the Government Subsidy of £2,000 had been earned during the financial year which ended on July 30. Mr. Dudley has been appointed to succeed Flt. Lt. Swoffer as Chief Instructor.

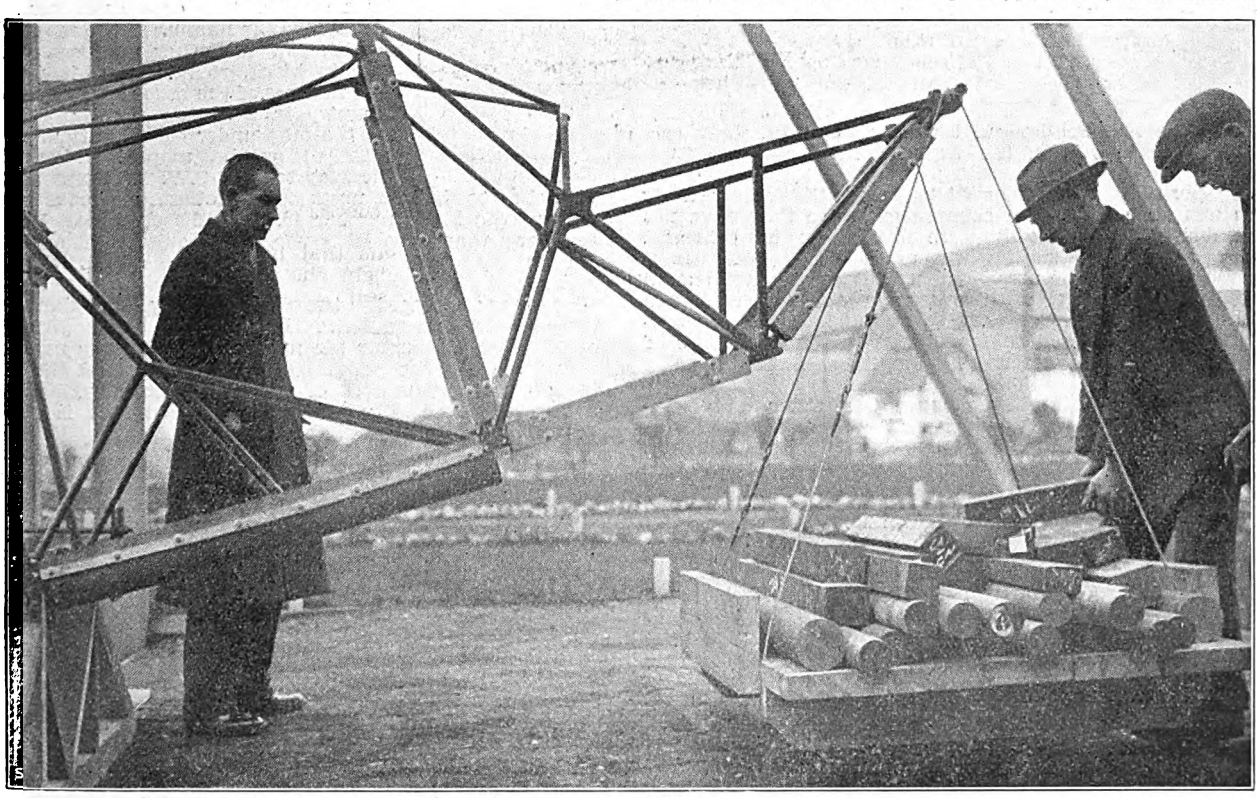
The Fourth Annual Dinner was held on Dec. 6, and was easily the most successful of these functions in the history of the Club. Over 150 guests and members were present.

Increased attention will be given to the social side of the Club's activities during 1930.

THE INDIAN LIGHT AEROPLANE CLUBS.

The Government of India has under consideration various proposals for the continued support of the Indian Flying Clubs. The three main proposals are: first, to continue financial assistance to the Aero Club of India; second, to continue the financial assistance to the four Light Aeroplane Clubs in Karachi, Delhi, Calcutta, and Bombay; and, third, to grant financial assistance to the two newly-formed Clubs at Lahore and Madras.

Details of the first proposal is not available, but it is understood that the financial commitment would be in the neighbourhood of 30,000 rupees. In fact, this sum has



A GOOD STRENGTH-WEIGHT RATIO.—The nose of the D.H. Moth III being submitted to a loading test. The actual weight of the cradle and its contents is approximately two tons.—("*Aeroplane*" *photograph.*)

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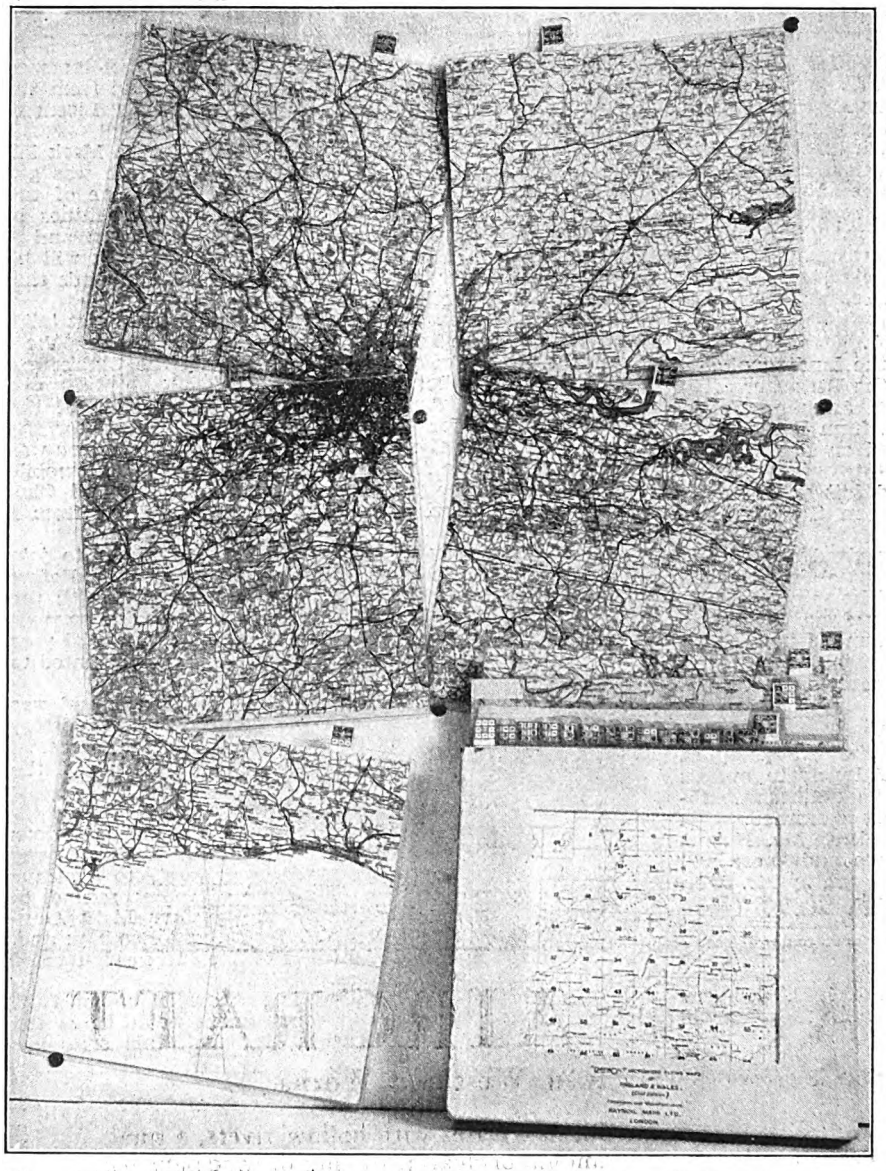
already been given to the Aero Club from Central Revenue with the object of establishing a central control of all subsidised Clubs in India, both in the interests of the Government and of the Light Aeroplane Clubs themselves.



The new Raynoil Sectionised Map arranged to show the relationship of the separate sheets with the key-map in the case. —(*"Aeroplane" photograph.*)

The position of the four Clubs is slightly different. In the short time they have been in existence they have not been able to prove that they are revenue-earning concerns, although when the subsidy was granted two years ago it was made part of the arrangement that the position should be reviewed regularly. With regard to the equipment loaned to the Clubs by the Government, in the interests of maintenance it is proposed to transfer it to the Aero Club of India, who will be responsible for its administration on their behalf.

On Jan. 13 the Standing Finance Committee of the Indian Legislative Assembly expressed every sympathy with the object of the flying clubs, but were doubtful whether, in a year of financial stringency, grants for new clubs could be found although they favoured a continuance of the grant for the existing clubs.

The point was made that large new demands for the completion of a programme of Civil Aviation were coming up before the Committee shortly.

One Indian representative stated that he had been given an assurance that, on the appointment of a Director of Civil Aviation, a scheme for training Indian youths in aviation would be taken in hand. As two years had elapsed since that appointment and no scheme had been started, he desired to oppose all grants for Civil Aviation, and asked that subsidies to light aeroplane clubs should be sanctioned on a decreasing scale.

At a later meeting of the Standing Finance Committee the subsidies for the four existing clubs were sanctioned for one year only. Grants to the proposed Clubs at Lahore and Madras were also approved for one year.—C. F. D.

MAPS FOR THE PRIVATE OWNER.

A set of sectionised maps covering the whole of England and Wales, are now being put on the market by Raynoil Maps Ltd. The sole agents for these maps are National Flying Services Ltd. The correct title for the set is the "Raynoil" Sectionised Flying Maps of England and Wales (Civil Edition). The scale is 4 miles to 1 inch.

Raynoil Maps are known all over the world of aviation and for some considerable time maps prepared by this firm have been used by entrants for the King's Cup and by numbers of long-distance flyers. Two of the more recent sets supplied were for Sir Philip Sassoon's tour to the East in the Blackburn Iris and the flights made by the Fairey Long-Range Monoplane.

The properties possessed by the patent process of Raynoil Ltd. are also well-known. The maps are contained in, and made an integral part of, a transparent envelope which is weather and oil-proof. This envelope prevents the map from being creased and torn though it is completely flexible.

The transparent envelope can be marked with coloured pencils, the marks of which when no longer needed can be rubbed out. A specially made set of the most suitable coloured pencils is sold by the firm.

As a result of the very satisfactory results obtained with these maps a large number of special sectionised "Raynoil" maps have been ordered by the Air Ministry. These maps are for use by the Royal Air Force.

The new set of sectionised maps for civil use is based on the experience gained with the making of sets for the R.A.F. At the same time special features for the private owner and club member have been added.

These maps are sold in a set of 70 contained in an open-fronted box with the familiar N.F.S. markings. There are 69 maps with a scale of 4 miles to an inch. No. 70 is a key map.

The maps are ten inches square and double-sided. At the top of each map is a tab with nine numbers arranged in a square. The centre number is in red and is the number of the map. The position of the other numbers, which are in black, round the centre, gives the number of the map required for the country in a similar position relative to the map under consideration.

Thus if one has map 54, which is the district to the S.W. of London, and one wishes to fly in a northerly direction, one looks at the top, sees the black number 45, immediately above 54, and one knows that map 45 is the one required. Should one wish to fly in a S.E. direction, map 64 is the one required.

The maps are placed in two rows in a very light aluminium map case of standard form. The numbers are from 1 to 35 and 37 to 69, except for the map in use, which is naturally in front. Only the odd numbers are visible as the even numbers are on the back of the odd numbers. Thus 56 is on the back of 55. In fact every even number is on the back of the next consecutive lower odd number.

The maps are contoured and marked in the approved Air Ministry fashion. The high ground is coloured in shades of brown. Wooded country is coloured green. All water, lakes, streams, and so on, are coloured deep blue. The railways are heavily marked. The aerodromes are marked in red and their names with large red capitals. All emergency landing grounds, racecourses, dangerous areas, ranges, and so on, are clearly defined.

In the middle of each map is a north point. The true north is given with the variation for 1928.

As these maps are printed in editions of fifty, they are always being brought up to date. At present some of the maps in this set are based on the "layered" map. As maps of the kind described herein become available, so will the "layered" maps be replaced. Some people prefer the "layered" style to the Air Ministry type.

The price for the complete set is Ten Guineas and seems more of an investment than a purchase.

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In Germany the increased facilities for meteorological research are regarded as the most important aspect of motorless flight. A return to early experimental practice has been made at the Rhoen-Rossitten Research Instiute who are very pleased with the method. Large flying models or rather gliding models are made of new types, and tested. When these tests are complete full-size gliders are made and used for further tests. The power units are added and the machine is finally tried as an aeroplane.

One of the most surprising things which has been found out by the various soaring flights is the tremendous up-currents to be found in clouds. At the end of last July a two-seat sailplane reached a height of over 4,000 ft. and flew a distance of 20 miles, both of which are records.

This was done by soaring beneath a cloud and finally climbing right up through it. A barograph record was kept throughout the flight and from this record one can see that in half a minute the sailplane with pilot and passenger climbed 500 feet. As the sailplane thus loaded had a sinking speed of 3.6 feet per second the up-current must have had a velocity of about 1,200 feet per minute.

A pilot flying a high-speed interceptor fighter who knew how to use such currents could spring some surprises on his opponents even if the currents did only last for half a minute. One questions whether an aeroplane of this type with a very high forward speed could remain in the upward moving shaft of air long enough to take advantage of it.

Colonel Sempill introduced the lecturers and gave a brief account of their careers. Dr. Georgii obtained his degree at Jena before the War 1914-18, and has since become an international authority on meteorology. He is now Professor of Meteorology at Darmstadt University. He is also Director of the Research Institute of the Rhoen-Rossitten Gesellschaft. Dr. Georgii first became interested in gliding ten years ago because of its possibilities for meteorological research.

Herr Stamer was in the Military branch of the German Air Force during the War 1914/18 and was shot down behind the allied lines. He remained a prisoner until the cessation of hostilities. After his return to Germany he became head of the Flying School at Wasserkuppe, where he has remained for the last ten years.

After referring to the different developments which followed the gliding competitions in Germany and England during 1922, Colonel Sempill said that there are six gliding schools in Germany. There are 100 clubs, 220 gliders and 60 soaring machines. There are 3,000 "A" 2,000 "B" and 300 "C" glider pilots. The latter are the fully qualified soaring pilots. He explained that as Dr. Georgii was not very familiar with English, Major A. R. Low would read the paper for him.

Dr. Georgii said he regarded the invitation of the Royal Aeronautical Society as a great honour to himself, to Herr Stamer, and to all German sail-flyers. He said that only in Gliding could Science and Sport work so closely together.

Major Low then read the paper. As this paper will be published by permission of the Royal Aeronautical Society, in the first bulletin of the British Gliding Association, which will appear shortly, one proposes only to recount the more salient features.

At Frankfurt in 1920 Herr Oskar Ursinus, the well-known editor of the German Aviation journal *Flugsport*, directed the young generation towards gliding as a substitute for the power-flight of which they were perforce deprived. He saw that thus could be combined the evolution of a light aeroplane and a cheap form of sports as well as a stimulus to technical and scientific work.

On his initiative the first gliding competition was held at the Wasserkuppe in August, 1920. The most successful machine was a low-wing monoplane designed and flown by Herr Wolfgang Klemperer, who is now with the Goodyear-Zeppelin Company of America.

In 1921 the Vampyr designed by Herr Madelung was the outstanding type. This was a high-wing cantilever monoplane and the fore-runner of the modern sailplane.

The low rate of descent necessary for a practical glider can be obtained either by reducing the sum of the resistance or by reducing the wing loading.

The first is done by building a machine with a large span, a high aspect-ratio and a cantilever wing. There is no undercarriage in the conventional sense and the fuselage is carefully streamlined. Sailplanes of this type have a margin of strength for high performance and for gusty weather. A high air speed is necessary for progress against strong winds and for passing through unfavourable down-currents.

Another method of reducing the rate of descent is to reduce the wing-loading. Although widely applied, this method is quite unsuitable for high performance. From this type the well-known Zögling or primary training type has been evolved.

Dr. Georgii emphasised the harm done by the extensive efforts made from 1921 to 1923 to connect variations in the horizontal velocity of the air with the performance of man-carrying gliders.

Dr. Georgii then explained how the long cross-country flights were first made by soaring over localities where there were good up-currents until sufficient height had been reached for the pilot to glide to another similar spot on the way towards his objective. Such flights are generally made across the wind.

In the Spring of 1928 measurements were made with an aeroplane flying beneath a cumulus cloud with the engine stopped. From the barograph readings obtained thereby and the known speed of descent of the aircraft rising-currents varying from 1 to 5 m./sec. were measured.

As a result of this a number of most successful flights have been made by soaring under and through clouds. Herr Kronfeld by such means flew 93 miles between the Wasserkuppe and Bayreuth. Dr. Georgii said that heights of from 4,000 to 4,500 m. (13,000 to 15,000 feet) will probably be reached by this method.

The soaring glider with an auxiliary engine is unsatisfactory both as a glider and as a power aeroplane. This line of development except for especial purposes has been given up in Germany.

After referring to the method evolved by the Research Institute for developing new types, Prof. Georgii closed his paper by hoping that the unusual combination of scientific and sporting interest would bring those present to join with the Germans in friendly rivalry in opening the regions of the air to man by means of soaring flight.

Herr Stamer's paper contained a detailed description of the Flying School at the Wasserkuppe. About 230 pupils pass through the course in a session of seven months. The school has fifteen machines of five different types. There are six Zöglings, three Prüflings and three types of soaring machines, including two two-seat machines.

Last year there were 269 pupils. Of these 139 passed the "A" test, 121 the "B" test and 30 the "C" test. After some fifty flights the pupil takes the "C" test. This requires a flight of at least five minutes with a continuous gain of height above the starting point.

No instruments are fitted to elementary machines. The more advanced types carry a light compass, a barograph and air-speed indicator. In research flights additional instruments are necessary.

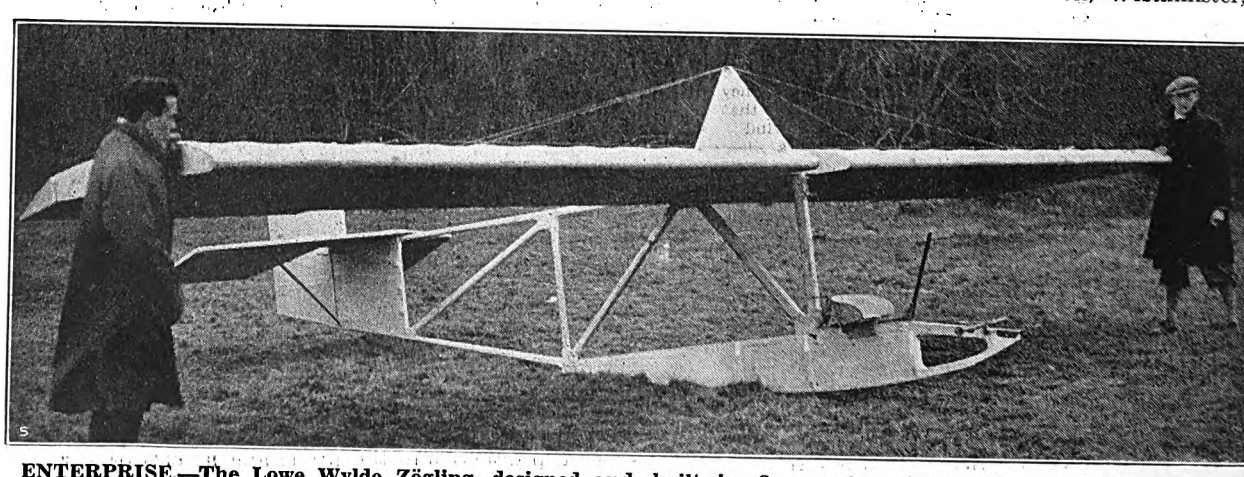
After the two papers an extraordinarily interesting and instructive film was shown. One thought it of especial value to would-be glider-pilots as it emphasised the long trudge back to the starting point.

The film was a composite one, the gliding schools at Rhoen and Rössitten both being photographed. Every type of glider and sailplane was shown. The manner in which the sailplanes cruise slowly round to gain height is very like the flight of a gull.

As time was rather short after the showing of the film, Colonel Sempill suggested that the discussion should be limited to those who would be unable to be present at the informal dinner when people would have another opportunity of asking questions.

One speaker asked what instruments were carried for measuring the vertical speed. He was told that no instrument had been evolved for such purpose and that a barograph was used. Mr. W. O. Manning asked what load factors were used, what was the gliding angle and in what manner the wings were built to resist torsion. He was told that the factors were six with the C.P. forward and one in the nose-dive condition. The single spar and plywood-covered nose strengthened the wing against torsion. The gliding angle was 1:20 and the sinking speed as low as .6 m./sec. or 1.97 ft./sec.

On Feb. 21, at the St. Ermins Hotel, Westminster, an



ENTERPRISE.—The Lowe Wylde Zögling, designed and built in five weeks. This glider was successfully launched from level ground on Feb. 23. —(*"Aeroplane" photograph.*)

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Informal Dinner and discussion were held jointly by the Royal Aeronautical Society and the Royal Meteorological Society. After the loyal toast and the health of the President of the German Reich had been drunk, Colonel Sempill reminded those present that the discussion that should have followed the lecture was to be combined with the informal discussion that evening.

An innovation for the informal dinner and discussion was the presence of a large group of students from the City and Guilds Engineering College. One understands that this group intends to form a club. This is the first sign of students belonging to any one college taking up the sport in this country.

Dr. Lempfert, the President of the Royal Meteorolgical Society, first spoke in German and welcomed the two lecturers on behalf of the Royal Meteorological Society, and regretted that they were all unable to be present at the lectures. In reading the papers the two points that made most impression were the extraordinary use to which ascending currents in clouds had been put and the fact that line squalls generally regarded as dangerous to aviation were of value to gliders.

WING COMMANDER G. F. PRETYMAN, D.S.O., asked if those who were gliding at Itford seven years ago could obtain their "C" licence pretty quickly. How soon could those who learned to fly on underpowered machines in the early days reach 6,000 feet. Dr. Lachmann, who was interpreter for Herr Stamer, said that a person of such experience should pass the "C" test after five flights. The height attained would depend on the weather.

MR. ALAN GOODFELLOW spoke on behalf of the Lancashire Aero Club and said that a gliding section had been formed which would be affiliated to the British Gliding Association. He asked whether the club should purchase a Zögling or Prüfling type of glider. He preferred the Prüfling as it was more easily transportable and simpler to rig. Dr. Lachmann said that the Zögling was best for novices, but that the Prüfling was better for pilots who could fly power-driven machines. The latter type was much easier to assemble.

CAPTAIN G. T. HILL, designer of the Pterodactyl, recounted his gliding experiences of 18 years ago and how his first glide was made at night. He asked what method was used for measuring vertical descent. The two translators explained that tests were made in the early morning in still air. Measurements were obtained with a barograph and a recording air-speed indicator. The rate of descent could then be obtained as a function of the forward speed.

The next speaker was one of the City and Guilds' students. He spoke in German. He was told that the costs of building the standard types of glider with unpaid labour were £13 for a Zögling, over £15 for a Prüfling and £75 for a sailplane. The fees for training at the Wasserkuppe were £12 10s. for students and £15 for others for four weeks. This included lodging and insurance, but not food, which cost from 2s. to 3s. per day. Free Luft Hansa tickets and reduced living accommodation were offered to students who intended visiting the Gliding Congress at Darmstadt on Mar. 8 to 10.

SIR GILBERT WALKER referred to his observations of bird flight in India and said that he had made calculations to show that dynamical flight was possible for a machine with a speed of 30 m.p.h. and gliding angle of 5 degrees.

Dr. Lachmann said that slots had not been applied to gliders because their designers had feared centrifugal forces, but the fitting of slots was now likely.

Dr. Scherpenberg, translating for Professor Georgii, said he did not think that birds obtained their energy from variations in horizontal velocity but from the vertical air currents.

MR. J. R. ASHWELL-COOKE, Chairman of the London Gliding Club, referred to the formation of the club, and said that it had two gliders. He asked whether any form of automatic launching had been tried as he thought that clubs would have some difficulty in obtaining adequate launching crews. He asked whether secondary training machines could be spun deliberately, if they went into spins when stalled and what were the average landing speeds of the Zögling and Prüfling. Dr. Lachmann said that automatic starting had not been used in Germany as launching crews were always available. There was some danger of catapult loads being too high. Gliders can be spun and this has been known to happen in clouds. The landing speeds of the Zögling and Prüfling were 15 m.p.h.

SQUADRON LEADER HAIG asked what instruments were used to show whether machines were ascending or descending. He was told that statoscopes had not been tried. Herr Kronfeld had used a variometer. A very sensitive altimeter was used which showed alterations of 10 metres.

MR. TILGHMAN RICHARDS described his early experiences with gliders in Westmorland and described the successful catapult which they used. This was similar to that used by the Wrights, except that the glider ran along a greased trough which was laid into the wind.

MR. SIMPSON referred to Dr. Georgii's trip to South America when he investigated the upper air currents throughout the journey. He was sure that aviation would reap the results of this investigation.

After this Colonel Sempill said that questions would have to be forwarded to Germany and that Professor Georgii would answer them in writing. One will therefore refrain from giving the questions as without answers they are of little interest.

In answer to a query about licences for glider pilots and gliders in this country, Mr. Howard Flanders said that the British Gliding Association was drawing up regulations which were being submitted to the Air Ministry. Sir Sefton Brancker had said that if these rules were suitable the Air Ministry would refrain from taking action.

Professor Georgii then expressed his gratitude in English before making a speech in German which was translated by Dr. Scherpenberg. He had seen some very suitable ground, especially the Chiltern Hills, which in some ways was more suitable than the terrain used in Germany.

MR. HANDLEY PAGE concluded the proceedings with a very humorous speech, in which he first thanked the two lecturers and their three able translators. He welcomed the new outburst of enthusiasm, which reminded him of the days before the Air Ministry burst like a policeman upon all our activities. He welcomed Sir Sefton Brancker's assurance that a set of simple rules from the National Gliding Association would be accepted. He foresaw that manufacturers would all give up aircraft and only manufacture gliders.

He had noticed with interest those who had been present. He noticed that two representatives of airscrew manufacturers, one of a well-known wheel and tyre manufacturer, and the Secretary of the body that governs the sport of flying in this country left early. Only commercial interest and enthusiasm were left. He saw that Major Buchanan of the Air Ministry was still there. He said that although we sometimes jeer at the Air Ministry we were all grateful for its aid in times of trouble. Anent the presence of Mr. Needham from Halton, he foresaw the time when the R.A.F. would flit like cherubs from cloud to cloud.

He thought that in gliding there is a chance to recapture the early enthusiasm which was really the only thing that mattered, though there *were* other considerations. He referred to the extraordinary achievements of Germany in face of every discouragement and said that they had done work of lasting value. We might well take them as an example.

THE GIDDY HARUMPHRODITE.—Designer, foreman-builder and pilot of the first glider of the primary training type to be built in this country.
—("Aeroplane" photograph.)

THE INAUGURAL MEETING OF THE BRITISH GLIDING ASSOCIATION.

On Mar. 27, at 18.30 hrs., the inaugural meeting of the British Gliding Association will be held at the Royal Society of Arts, 18, John Street, Adelphi, W.C.2. The President, Air Vice-Marshal Sir W. Sefton Brancker, K.C.B., A.F.C., will be in the chair.

A short historical survey of gliding in this country and abroad will be given and this will be illustrated with lantern slides. After the lecture the business of adopting the rules electing the first Council and the like will be done.

Founder Members can be enrolled up to Mar. 25 at £1 1s. and they will have power to vote at the Inaugural Meeting.

LIEUTENANT EIELSON.

On Nov. 9, of 1929, Mr. Carl Eielson left Teller, Alaska, with his mechanic, Mr. Earl Borland, to carry provisions and aid to the crew of the *Nanuk*, which was ice-bound off Cape North Siberia. This was Mr. Eielson's second trip, as some days previously he had rescued six passengers from the ice-bound ship.

On this second trip the machine flew into a blizzard and was wrecked. For some time the machine was missing, and when it was found in January, hope still remained that the aviators might be alive somewhere. The bodies of both have now been found and flown to the *Nanuk*.

In 1923 Mr. Eielson, who was an American of Norwegian descent, established the first air transport service in Alaska, when the U.S. Post Office Department granted him the winter mail contract between Fairbanks and McGrath. He continued this work for three years.

From 1926 to 1928 he had acted as pilot to Captain Wilkins on various expeditions into the Arctic and in 1928 he flew with the same companion across the North Polar regions, from Point Barrow, Alaska, to Spitzbergen. Thereafter he returned to his aviation work in Alaska.

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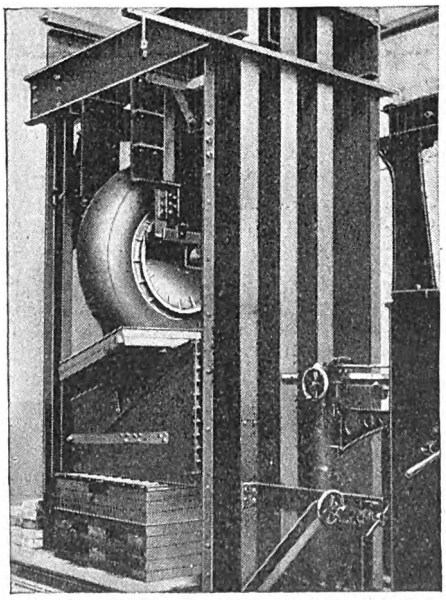

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COMMERCIAL AERONAUTICS.

WESTERN CANADA AIRWAYS.

During the quarter ending Sept. 30, 1929, Western Canada Airways flew a total of 313,639 miles or 3,765.23 flying hours, and carried 5,054 passengers, 687,486 lbs. of express freight, and 85,350 lbs. of mail.

The principal operations of the company are to serve prospectors and mining companies, carry passengers, mail and freight, food supplies, mining equipment and machinery in the Patricia District of Ontario, in South-Eastern and Northern Manitoba, in Northern Saskatchewan, in Northern Alberta, and in Northern British Columbia. The company also maintains fishery patrols along the indented littoral of British Columbia in the summer months.

In addition to regular flying over established routes, special flights are frequently made to various parts of Canada either for exploration and prospecting or for the transportation of sick and injured.

The company's bases are at Sioux Lookout, Ont., Allanwater, Ont., Lac du Bonnet, Man., Cranberry Portage, Man., Emma Lake, Sask., Prince George, B.C., Stewart, B.C., and Vancouver, B.C.

In the Mackenzie River area air routes have been opened for the convenience of trappers, fur-traders, prospectors, and for general commerce from waterways along the course of the Slave River to Fort Resolution and along the Mackenzie River to Fort Simpson, Wrigley, Norman, Good Hope, Arctic Red River, and Aklavik.

For the fishery patrols in British Columbia sub-bases have been opened at Prince Rupert, Alert Bay, Quathiaski Cove, Queen Charlotte, Beaver Bay, and Swanson Bay.

Western Canada Airways maintains a ground school at Winnipeg during the Winter months, that is, from September to April. Actual flying instruction can be had during the Summer by arrangement with an associate company.

Mail is carried regularly on contract from Sioux Lookout, for the Red Lake and Woman Lake mining areas; from Lac du Bonnet for the South-Eastern Manitoba mining area.

A contract for carrying of mail by air by night over the route Winnipeg-Regina-Saskatoon-North Battleford-Edmonton - Regina - Moose Jaw - Medicine Hat - Calgary has been awarded to Western Canada Airways.

All available aircraft of the company based at Sioux Lookout were pressed into service last summer to help the Ontario Provincial Air Service to cope with unusually large outbreaks of forest fires in the Patricia Area of Ontario. In this work nine machines were used, 50,667 miles were flown in 712.21 hours' flying time, and 569 passengers and 113,585 lbs. of equipment were carried.

Western Canada Airways uses Fokker Universal four-passenger, Fokker Super-Universal six-passenger, and Fokker Tri-motor ten-passenger monoplanes in its general transport work in Central and Northern Canada. A Junkers W-34 monoplane is used for general operations and photography.

These machines are flown principally as seaplanes in the Summer and on skis in the Winter. Boeing flying-boats are used exclusively in British Columbia.

For the operation of the Prairie Air Mail Route from Winnipeg to Calgary the company has bought a number of Fokker F.14 six-passenger monoplanes fitted with 525 h.p. Pratt and Whitney Hornet engines.

For the organisation of the Calgary—Regina, Regina—Winnipeg, and Edmonton—Regina air mail routes to be operated by Western Canada Airways, contracts have been let by the Post Office for the supply of 15 24-in. electric rotating beacons of 3,000,000 candle-power, with 14-in. course lights to be installed at the following municipal airports: Winnipeg, Brandon, Regina, Moose Jaw, Medicine Hat, Calgary, Saskatoon, and North Battleford, and at the following emergency landing grounds: Oakville, McGregor, Petrel, Rivers, Arrow River, Moosomin, and Broadview.

Forty-one acetylene air beacons of 3,000 candle-power will be put up between Broadview, Sask., and Calgary, Alta., at 10-mile intervals.

A survey is to be made to establish beacons between Regina and Edmonton on the same basis.

On the route between Winnipeg and Calgary radio-beacon stations at Forrest and Regina are being installed. It is expected that these routes will be inaugurated some time in December.

ACCELERATING THE SWISS MAIL.

The Times reports that the Swiss Federal Air Office is proposing to run air mail services between Switzerland and the French ports of Havre and Cherbourg, to accelerate the transport of mails to North America.

A NEW CANADIAN VENTURE.

The Bellanca Aircraft of Canada Ltd. has been formed in Montreal to succeed and take over in its entirety Bellanca Aircraft of Canada, Registered, which was organised in August 1929 to act as representative in Canadian territory for the Bellanca Aircraft Corporation of Newcastle, Delaware, U.S.A.

The new company has been formed by Canadians and is financed by Canadian capital. It is not a subsidiary of the American company but has contracted with the American company for the exclusive right for the distribution and service of Bellanca aircraft in Canada.

A number of Bellanca aircraft have already been sold in Canada. Commercial Airways Ltd. of Edmonton has bought three with which to operate the 1,800 mile air route from Fort McMurray to Aklavik on the Arctic Ocean.

Mr. D. M. Martin, President and General Manager of the company, said in the course of an interview: "We believe that the Bellanca excels in every requirement of the cabin class for Canadian flying, which includes forest patrol, mail lines, prospecting, passenger service, whale bombing, transportation of mining and medical supplies, photographic work, etc., etc.

There is only one British cabin monoplane in Canada. This is the D.H. Hawk-Moth which is at present on test under local conditions. During its short period in Canada it has aroused very favourable comment, and everyone will hope that it will reproduce the success of the Gipsy-Moth which has reaped for the De Havilland Aircraft Co. Ltd. and its Canadian branch the De Havilland Aircraft of Canada Ltd. the reward of painstaking enterprise.

ENGLAND—EGYPT.

On Feb. 9, Mr. Ronald Kemp, Managing Director of the Air Survey Co. Ltd., with Mr. Calder as passenger, left London on a second Fairey III.F biplane (Armstrong Siddeley Jaguar engine) to fly out to the Sudan where the company is engaged on a big survey contract. He reached Lyon later in the day.

On Feb. 11 he arrived at Pisa and on the following day he reached Trapani, on the west coast of Sicily.

On Feb. 15 the machine arrived at Benghazi on the North African Coast, and on the following day it reached Cairo. Here Mr. Kemp was detained for several days on business.

EN ROUTE TO TOKYO.

On Feb. 23, Mr. Van Lear Black, who is flying to Tokyo on his Fokker tri-motor *Maryland State,* piloted by Messrs. Geysendorffer and Scholte, reached Cairo. The machine had flown non-stop from Tripoli and covered the distance of 1,140 miles in eight hours and forty minutes.

ANOTHER AFRICAN SURVEY.

The Times reports that a machine which belongs to Wilson Airways Ltd. has been engaged to make an aerial survey of the flooded area around Kidete, Tanganyika Territory.

BRITISH ENTERPRISE IN THE WEST INDIES.

A report in *The Times* of Jan. 30 states that a Captain Holland arrived at Kingston, Jamaica, on Jan. 28 in a Canadian Vickers flying-boat. He is making an investigation into the prospects of commercial and civil aviation in the West Indies.

This is good news. There has been so much activity by Americans and others that all the air transport and available market seemed likely to be absorbed by them.

This news, together with the announcement of the formation of a company known as West Indian Airways, indicates that British enterprise is investigating the ground, or, rather, water, and one can only hope that such foresight will reap a deserved reward.

COTTON DUSTING IN PERU.

The Cia. de Aviacion Faucett S.A., of Lima, Peru, has acquired the sole control of the Peruvian business of Huff-Daland Dusters, Inc. The transaction includes the transfer of all business contracts, the rights for cotton-dusting in Peru and all equipment to the Faucett Company.

Huff-Daland Dusters Inc. first entered the Peruvian field four years ago and the interests of this concern were, from its inauguration, in the hands of Peruvian Airways.

The Faucett Company expects to start with a big programme this year. This company, founded by Mr. Elmer J. Faucett many years ago, operates four regular air lines in Peru with Stinson cabin monoplanes. Extension of these lines is contemplated In addition the cotton-dusting activities will add to their programme. The present dusting fleet of six machines were taken over from Huff-Daland Dusters but two new machines are on order and are due for delivery in the spring.

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A MILE BY AIR FOR THREE FARTHINGS.

On Feb. 13 a D.H. Gipsy-Moth with pilot and passenger flew from Brisbane to Melbourne, a distance of 1,000 miles, in 13 hrs. 20 min. The cost is reported to have been £6 10s.

COMMERCIAL AVIATION SUBSIDIES.

In the House of Commons on Feb. 19, in reply to Mr. Wise, the Under-Secretary of State for Air said that the subsidies voted in this country, Germany, France, and Italy, in respect of the financial year beginning at different dates in 1929, had been respectively £354,000, 10,550,000 reich marks (excluding financial assistance from local authorities), 172,300,000 francs and 54,500,000 lire. No comparable figure could be quoted for the United States of America, as financial assistance for this purpose was there given in the shape not of direct subsidies but of mail contracts placed at higher rates than those recoverable from the public through air mail surcharges. The amount thus voted for payments to air mail contractors for the year beginning July 1, 1929, had been $17,600,000.

With regard to Germany he agreed that the figures for the subsidies from the local authorities were by far the biggest factor but there was some difficulty in getting them.

A SPANISH-DUTCH AGREEMENT.

An Air Convention between Spain and Holland, regulating various points concerning aerial communications, has been signed in Madrid.

AN AIR PARK FOR CARLISLE.

The first step towards the making of an Air Park for Carlisle has been made. The Greymoor Hill Estate has been bought for this purpose by the Carlisle Corporation from Sir James Watt.

The new Air Park will be to the north of the City on the main road to Glasgow and Edinburgh.

THE PLYMOUTH MUNICIPAL AERODROME.

The Plymouth City Council has received sanction for a loan of £20,000 for the purchase of Roborough polo ground as a site for a municipal aerodrome.

THE INDIA AIR MAIL AND GREECE.

On Feb. 24 the Athens correspondent of *The Morning Post* stated that the Greek Ministry of Aviation has granted Imperial Airways a provisional convention of three months' duration for the transit of the Indian Air Service across Greece, pending the conclusion of a definite agreement regarding landing at Greek aerodromes, the transport of mails, and the constitution of a Greek aviation company.

In a month's time the regular Indian air service will operate by way of Belgrade and Athens.

AIRCRAFT IN THE ANTARCTIC.

Rear-Admiral Byrd and his companions have sailed for home. *Reuter* states that aeroplanes and other material have been left behind. This expedition left Dunedin, New Zealand, in December, 1928.

Sir Hubert Wilkins who has also been making aerial surveys in the Antarctic, reached Monte Video on Feb. 27.

The Norwegian Antarctic expedition in the *Norvegia* are still doing survey work in the neighbourhood of Coates Land. Captain Riiser Larsen and Captain Lietzow Holm mapped further new land on Feb. 20.

CROYDON NOTES.

Next Summer it looks as though someone will have to come down from the Control Tower and do a spot of tarmac traffic control at times, complete with white elbow sleeves, truncheon and forbidding expression of countenance.

Imperial Airways have scheduled five services both ways in the height of the season, and K.L.M. have a similar number, commencing at 06.00 hrs. with a freighter and finishing (pale but determined) with a 20.55 hrs. arrival.

Air Union and Sabena have no less than nine services in and nine out between them, though two or three of these are night services. Luft Hansa have several arrivals and departures, and a new note is to be struck by the arrival, one hears, of the far-famed Czechoslovakian Air Line at Croydon in the Summer. When bad weather has hindered early departures, and all these machines are trying to get away at the same time, there will be many a hard word spoken not altogether in jest, by frenzied Traffic Staff. Nobody has ever heard a Czechoslovakian in a peevish frame of mind at Croydon yet, and rumour hath it that these people will win in any wordy warfare they get mixed up in.

The K.L.M. Summer programme shows a Berlin express, leaving Croydon 13.00 and connecting in Berlin with a night flying service of Deruluft, the combined German and Russian Air Line, which gets passengers to Leningrad at 11.30 hrs. and Moscow at 14.15 hrs. next day. Doubtless this service will be popular with religious refugees coming this way and with Ogpu pursuers with fur hats, indistinguishable from their whiskers, who, one hopes, will take return tickets and fly back baffled, to free and glorious Russia.

The K.L.M. Air Line pilots, almost all of whom made two and in some cases, three return trips on the Amsterdam—Batavia air mail route, speak very highly of the three-Titan-engined Fokkers for that sort of work. The Titan-Fokker is one of the machines which really does fly on two out of three engines, as both K.L.M. and Sabena pilots know well. A long time ago one of the K.L.M. pilots took a loaded Fokker of this type off from Brussels on two engines.

Another thing K.L.M. pilots have nothing but praise for is the wonderful hospitality, help and good fellowship they met with from our R.A.F. all along the route, which is a pleasant thing to contemplate, and makes one wish politicians were human beings too.

Turning to home affairs, an impressive ceremony was witnessed on Saturday afternoon, when the acting Air Superintendent, a stocky lad of the bulldog breed, was presented with a rich smelling cigar of phenomenal length by a High Official.

Although he had to lean back at the angle of a Captain going down with his ship in order to balance it, he strutted proudly about the Main Hall with it, teeth clenched on the butt and smoke oozing out of the ears. When he turned his head, people yards away had to duck in order to save their hats being swept off. In the end, fatigue overcame him, and he had to send for the billiard marker with a rest. It was a glorious sight while it lasted however.—SPRY.

THE LONDON TERMINAL AERODROME.

ANALYSIS OF FIGURES FOR PAST WEEK.

Trips per Day.—Sunday, 8; Monday, 19; Tuesday, 18; Wednesday, 18; Thursday, 18; Friday, 18; Saturday, 18.

IMPERIAL AIRWAYS LTD.:
London—Egypt—India: London—Le Touquet—Paris—Basle—Zurich: London—Ostend—Brussels—Cologne and return: Machines 39, passengers 199, freight 12¾ tons. India Route: Inward, passengers 0, mail 0 lbs.; outward, passengers, 0, mail 458 lbs.

AIR UNION:
Paris—London: Machines 36, passengers 103, freight 8¾ tons.

K.L.M.:
Amsterdam—Rotterdam—London: Machines 12, passengers 31, freight 5¼ tons.

SABENA:
Brussels—London: Machines 12, passengers 17, freight 2¼ tons.

DEUTSCHE LUFT HANSA A.G.:
Amsterdam—London: Machines 13, passengers 19, freight 3¼ tons.

MISCELLANEOUS:
British machines 5, passengers 3.
Foreign machines 0, passengers 0.
Total number of trips by British machines, 44, carrying 202 passengers. Foreign machines, 73, carrying 170 passengers.

COMPARATIVE FIGURES.

Week ending Feb. 22:
Machines, 117; Passengers, 372; Crews, 301; Total personnel, 673.
Corresponding week, 1929:
Machines, 98; Passengers, 335; Crews, 195; Total personnel, 530.
Corresponding week, 1928:
Machines, 97; Passengers, 427; Crews, 187; Total personnel, 614.
Corresponding week, 1927:
Machines, 68; Passengers, 198; Crews, 160; Total personnel, 358.
Corresponding week, 1926:
Machines, 81; Passengers, 230; Crews, 101; Total personnel, 331.
Corresponding week, 1925:
Machines, 74; Passengers, 134; Crews, 89; Total personnel, 223.
Corresponding week, 1924:
Machines, 46; Passengers, 38; Crews, 72; Total personnel, 110.
Corresponding week, 1923:
Machines, 53; Passengers, 164; Crews, 102; Total personnel, 266.
Corresponding week, 1922:
Machines, 45; Passengers, 81; Crews, 74; Total personnel, 155.
Corresponding week, 1921:
Machines, 30; Passengers, 32; Crews, 38; Total personnel, 70.

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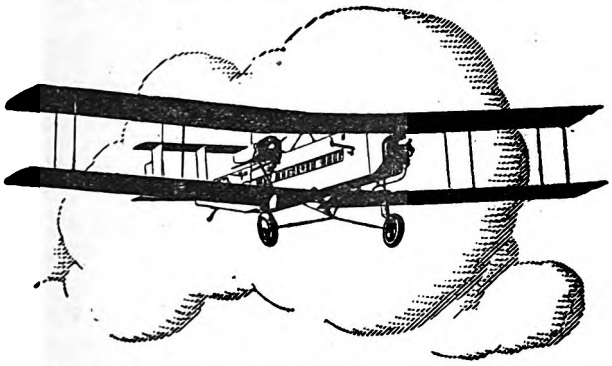

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AIRWAYS HOUSE, CHARLES STREET, LONDON, S.W.1

Telephone: Regent 7861/5.
Telegrams: "Impairlim, London."

C.F.H.

The British Russell Parachute Co., Ltd.
Aircraft Accessories,
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Telephone: Clissold 2184.
Telegraphic Address: "Parachutes, Stoke, London."

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Beg to announce that they are now in a position to accept orders for GLIDERS and SAILPLANES of types approved by the B.G.A. Orders will be accepted in strict rotation.

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ATLANTIC AIRWAYS LTD.

Mr. Alan E. L. Chorlton, C.B.E., M.Inst.C.E., the well-known Consulting Engineer, who has just returned from a visit to Trinidad, has joined the Board of Directors of Atlantic Airways Ltd., the British Company which was formed recently to organise public air transport services in the West Indies.

The Directorate of Atlantic Airways Ltd. now consists of Sir Algernon Aspinall, C.M.G., C.B.E. (Chairman), Lt. Colonel Ivan Davson, O.B.E., Air Commodore J. G. Weir, C.M.G., Mr. Alan E. L. Chorlton, C.B.E., M.Inst.C.E.

The Managing Agents and Secretaries of the Company are Garraway, Black & Co., of Avenue Chambers, Southampton Row, W.C.1.

IRVING AIR CHUTES IN CANADA.

The Irving Air Chute Co., Inc., of Buffalo, N.Y., is establishing a Canadian factory at Bridgeburg, Ont., just over the Canadian border on the opposite bank of the Niagara River to Buffalo.

This is the latest of the many American factories which have been established on the Canadian side of the Niagara River. This locality, with Buffalo as the centre, is becoming known as International City.

GET IT AT HARRODS.

About two years ago the World-famous emporium, Harrods, Ltd., held a display of aircraft in their Knightsbridge showrooms and they were successful in creating a considerable amount of interest in aviation among the general public.

The firm is reviving its interest in aviation and it is shortly opening an Aviation Department. The first machine to be exhibited in the showrooms will be a D.H. Gipsy-Moth. The firm is in close touch with the various manufacturers of light aircraft and aircraft accessories as well as flying schools and they will be able, although they will not stock all, to supply any make of aeroplane, all the necessary accessories, and to arrange for flying lessons for their customers.

The representative in charge of the department, who is a qualified pilot, will be able to advise customers on all details concerning their purchase and will also be in a position to give general information on private flying, to supply books, maps, etc. Harrods are also instituting a Weather Bureau from which they will issue weather reports twice daily. In this way they are hoping to cater for all the requirements of the private owner.

A GOOD SHOW.

One of the best performances in British Civil Aviation of late is that of Mr. R. Waters of Reigate. He started learning to fly at Lt.-Col. G. L. P. Henderson's School on Aug. 31, 1929. He took his "A" licence in remarkably short time and then went on to do his 100 hours' solo flying to qualify for a "B" licence. He finished 100 hours on Jan. 3, 1930, and since then he has passed all the Air Ministry tests and examinations and is now a fully fledged "B" licence pilot, qualified to carry passengers for hire or reward. One gathers that his intention is to start a private flying school at Reigate on an aerodrome of his own.

Here perhaps we may remark that by far the finest flight yet done by any aviator other than a European was that of Mr. Selim Sassoon Daniel, who was also trained by Col. Henderson. His remarkable flight in his Gipsy-Moth from Croydon to Baghdad between Dec. 6 and Jan. 6 stamps him as a pilot of unusual quality.

DECREASED RATES.

Philips and Powis Aircraft (Reading) Ltd. notify that their rates for tuition have now been reduced to £2 an hour. Pupils can buy a book of twelve 15-minute vouchers for £6. For trial lessons, or short flights, 11s. is charged for each flight of 15 minutes. The firm wish to emphasise the fact that there is no entrance fee or subscription to their school and no extras of any kind.

NEW COMPANIES.

AERIAL PUBLICATIONS LTD.—Private company. Registered Feb. 8. Capital, £2,000 in 5s. each. Objects: To carry on the business of aerial guide compilers and publishers, etc. The directors are: H. Cox, 7, Hayville Gardens, Barkingside, estate manager. G. Parratt, Lavender Villa, Passmore Bridge, Farnham, editor. C. G. Colville, 64, Osborne Road, Palmers Green, N.13, merchant. W. von Reiffenstein, 57, Stapleton Hall Road, N.4, merchant. Secretary: C. G. Colville. Registered office: 24 and 26, Holborn, E.C.1.

PERSONAL NOTICES.

MARRIAGE.

HOWELL—TRINHAM.—On Feb. 11, at Stourbridge, Flg. Off. Alfred John Howell, R.A.F., Kenley, Surrey, son of Mr. and Mrs. C. E. Howell, of Pedmore, Worcestershire, to Mary Agnes Trinham, daughter of Colonel and Mrs. Trinham, of Oldswinford, Worcestershire.

BIRTHS.

BOWLES.—On Feb. 15, at "Thornbury," Southsea, to the wife of Flg. Off. John Bowles, R.A.F.—a son.

PAYNTER.—On Dec. 22, at Peshawar, to Barbara, wife of Flt. Lt. N. S. Paynter—a daughter.

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Boulton & Paul, Ltd.	
Bristol Aeroplane Co., Ltd.	Bristol
De Havilland Aircraft Co., Ltd.	Cirrus or Gipsy
Fairey Aviation Co., Ltd.	Napier
Hawker Engineering Co., Ltd	Rolls-Royce
Gloster Aircraft Co., Ltd.	
George Parnall & Co.	Armstrong-Siddeley
A. V. Roe & Co., Ltd.	Armstrong-Siddeley
S. E. Saunders & Co., Ltd.	Rolls Royce, Napier
Short Bros.	Rolls-Royce
Simmonds Aircraft, Ltd.	Cirrus
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Westland Aircraft Works	Cirrus

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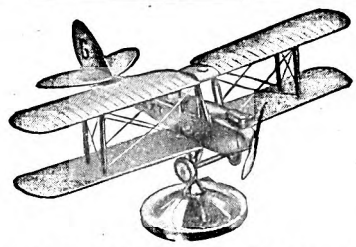
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For the convenience of Advertisers, replies can be received at the office of THE AEROPLANE, Cannon House, Pilgrim Street, London, E.C.4.

Special PREPAID Rate—18 words 4/6, 3d. per word after; 13 insertions, 18 words, 4/-; 26 insertions, 18 words, 3/6; 52 insertions, 18 words, 3/-, 2d. per word after. Situations Wanted ONLY—18 words 1/-. Box No. 6d. extra.

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The Aircraft Operating Co. Ltd., 8, New Square, Lincoln's Inn, London (Holborn 8131), and Bulawayo, Southern Rhodesia; Cairo, Egypt; Rio de Janeiro, South America: Contractors to the Ordnance Survey. Laboratories and Subsidiary Company for aerial photography in the British Isles. Aerofilms Ltd., Colindale Avenue, Hendon (Colindale 6183 and 6184).

AIRCRAFT INSTRUMENTS.

Aeroplane Wheels, New. Fitted with Dominion 26 x 2½ heavy tread tyres, and new tubes. Pair, complete with axle and bushes, 70s. carriage forward; Windscreen Frames and Brackets, without glass 2s.; K.L.G. Plugs, F.9 new, 9s. 9d. doz. Revolution Indicators, Smith's, 600-2,600 r.p.m. with 3 ft. drive, 22s. 6d.; Above postage paid. Send for free list. Coley Ltd., Ordnance Works, Queen Elizabeth Road, Kingston-on-Thames. 'Phone 0365.

AIR TAXIS.

Air Taxis Ltd., Stag Lane Aerodrome, Edgware. 'Phone: Edgware 0849.

Aerofilms Limited, Aerial Tours, Taxi Work, Aerial Photography. Air Survey. Colindale Avenue, Hendon, N.W.9. 'Phone: Colindale 6183 and 6184.

National Flying Services Ltd. (See page 354.) Go by N.F.S. 1s. a mile; 1s. 6d. two passengers.

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"Eagle" Aircraft Cameras and Equipment. Specialists in air photographic apparatus. Particulars from the manufacturers and patentees, Williamson Manufacturing Co., Litchfield Gardens, Willesden Green, London, N.W.10. Telephone 0073-4 Willesden. Telegrams, "Kinetogram Willroad London." Contractors to the Admiralty, Air Ministry, War Office.

AEROPLANE PHOTOGRAPHS.

Copies of "The Aeroplane" copyright photographs may be had on application. All types of Aircraft; R.A.F. and Commercial and Light Aviation activities, etc. 8½ x 6½ in., one copy 2s. 6d. Three or over 1s. 6d. Larger sizes on application. Photographic Department, THE AEROPLANE, 175, Piccadilly, W.1.

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Henlys (1928) Ltd., Devonshire House, Piccadilly, W.1. Telephone, Grosvenor 2271. Sole Concessionnaires for the Avro Avian, for England. Authorised Moth Agents. Your car taken in part exchange, if desired. Deferred terms. Trade inquiries invited for Avian.

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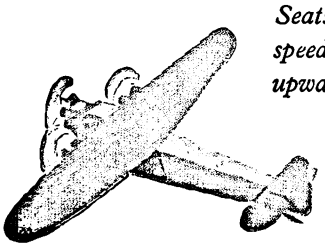

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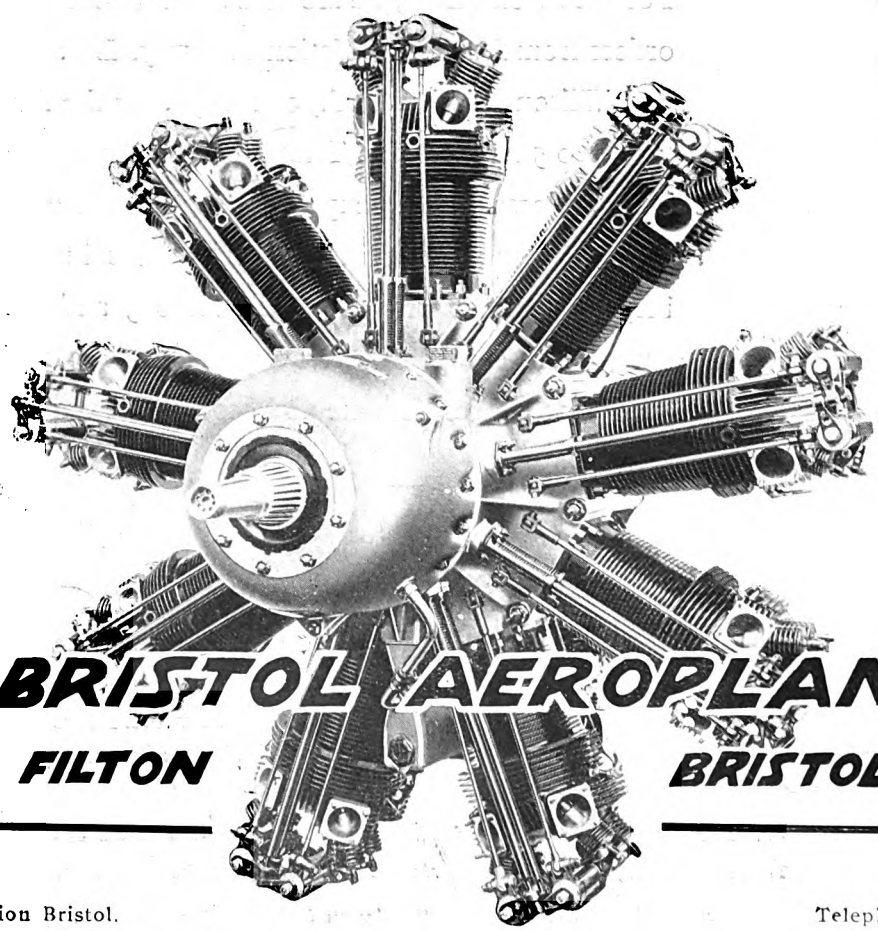

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INCORPORATING AERONAUTICAL ENGINEERING

Edited by C.G.Grey

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Aeronautical Engineering

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ON HOW TO GET INTO AVIATION.—I.

In these days every youngster wants to become an airman or get into aviation somehow or other, just as in the past generation every boy wanted to drive a motor-car, and as, in a generation earlier than that, the great ambition of every youngster was to become an engine-driver. Probably in generations before that, every boy wanted to ride a horse, or else wanted to go to sea. In these days, the air is supreme, and before long every gentleman will be expected to fly just as in ages past the equestrian class was the aristocracy. Therefore, probably, a good purpose may be served by giving a few hints on how to get into aviation.

These notes are published rather in self-defence, for by every post there come to this office, demands from people of all sorts asking how they themselves, or those dependent on them, may become aviators or may get work in the aircraft industry.

These questions come from all sorts and conditions of people. They come from fathers and mothers of small boys who have been bitten with the air craze, or, as Sir Samuel Hoare would, perhaps, rather have us say, have become air-minded. They also come from parents of boys who are about to leave school and wish to become aeronautical engineers rather than mere pilots. And these worried parents range in position all the way from working men in obviously poorly-paid employment up to professional men who are quite prepared to apprentice their sons and to pay a handsome premium.

Also they come from schoolboys themselves, some of whom want to get into the Royal Air Force, some merely want to get into Civil aviation as pilots because they do not like the idea of the discipline of the King's Fighting Services. And they come from boys who, knowing that they have some physical defect which would prevent them from becoming flying officers or civil pilots, nevertheless, wish to get into what they very rightly regard as the great industry of the future.

Also, they come from young men in all conditions of life. Intelligent and evidently well-educated young workmen want to get into the aircraft business. One may be a grocer's assistant, who is fed up with serving behind a counter. Another may be a thoroughly skilled engineer who sees a greater opening for his engineering training in building aircraft.

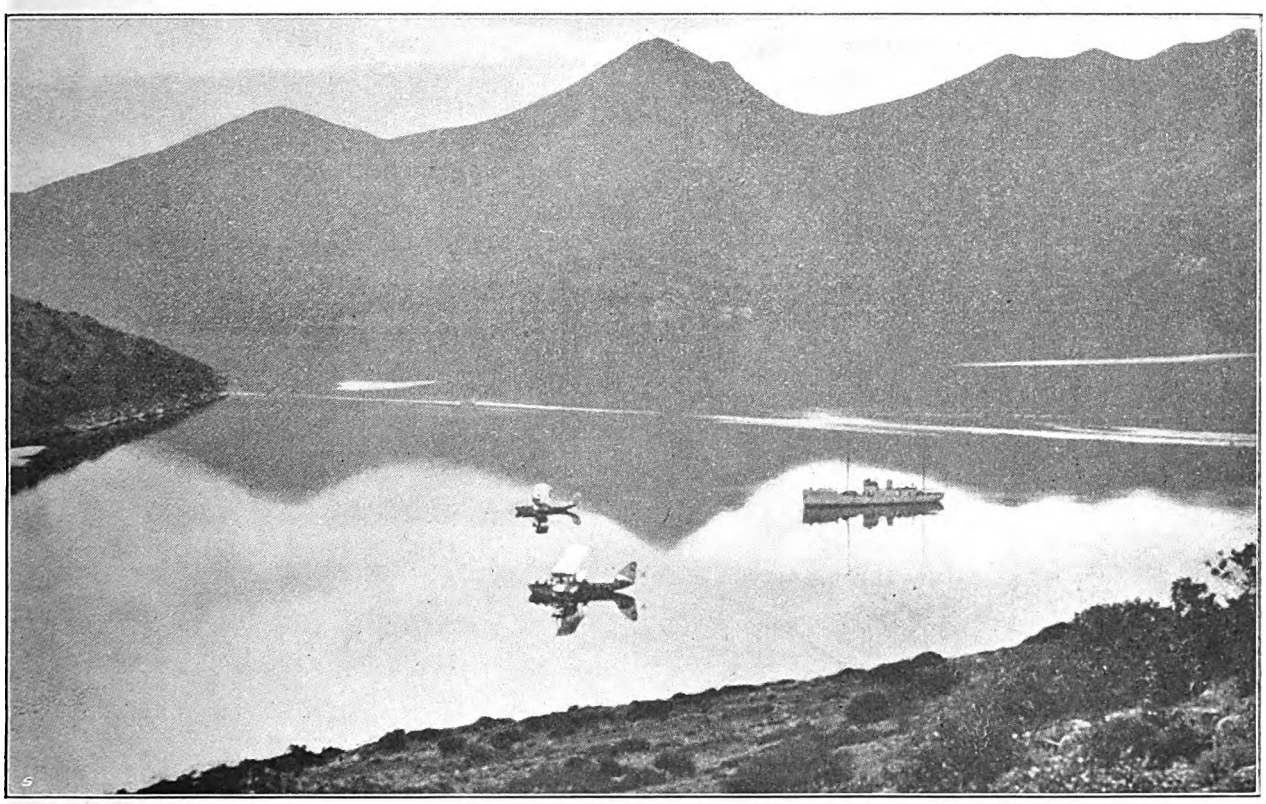
Others again come from young men more or less, in the learned professions. The same question has been asked by a fully qualified chartered accountant, and by a man who has passed his legal examinations and is on the verge of being a qualified solicitor.

Again, in a different line, the same question has been asked, unhappily only too often, by short-service officers in the Royal Air Force, who are shortly leaving and want a job in Civil Aviation.

The Young Idea.

Even the very young have quite distinct ideas of what

"AND I FINALLY CONCLUDED THAT IF I DID NOT FLY THITHER (TO INDIA) IT WAS IMPOSSIBLE TO MAKE THE JOURNEY."—
PERO TAFUR; 1435.



THE THIRD ROUTE.—Two Short Calcutta flying-boats moored at the Imperial Airways' base at Mirabella, Crete, on the England—India route. The vessel seen is the S.Y. "Imperia," the Imperial Airways' tender and depot ship.

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they want when becoming Aviators. There is a charming story of a male child who has a quite senior Naval Officer for a father, and an equally senior Air Force Officer as an uncle by marriage.

One day, out walking with the two, and having apparently committed some misdemeanour which put him on bad terms with his father, the uncle, by way of making conversation, asked him what he was going to be when he grew up.

The child answered at once, "I'm going to be a nairman." His father turned to him, and said, "I suppose you're going to join the Navy and qualify for the Fleet Air Arm." "No!" said the child with determination, "I'm going to be a real nairman!"

Without in any way approving the slight thus cast upon his father's profession by this infant, one cannot but approve his fixed determination to become an airman and devote himself whole-heartedly to that profession. And, doubtless, as he grows older, that child will follow in his father's footsteps by becoming a distinguished Naval officer who will no doubt in time command Air Fleets at Sea. But let us consider rather those who are less happily situated, by birth and education.

Beginning at the beginning, let us take the case of an intelligent lad at school who at a reasonable age, of, let us say, 14 or thereabouts, has made up his mind to go into the aircraft business somehow or other. And, let us suppose that he has no well-to-do parents to put him into the Air Force as a cadet at Cranwell, or to place him with an established aircraft firm as a premium apprentice. That boy has two lines of action and two only.

The Working Lad's Way.

First, if he has enough intelligence and has had as good an education as a modern Board School provides, and if he can produce a certificate of good character from his schoolmaster and from some person in a responsible position, such as the local clergyman of any denomination or from a doctor, he can apply to be taken as an apprentice at the Royal Air Force School of Apprentices at Halton. If he passes the entrance examination, he then does three years as an Aircraft Apprentice. What happens to him after that is entirely a matter of his own personal ability.

He may pass into the Royal Air Force as an ordinary aircraftman. Even if he is naturally delicate, he will certainly be well looked after there, and he will be so well fed and exercised that he will probably outgrow his delicacy and become a sound and solid young man. He must be physically fit, for an aircraftman in the Air Force has to be a Grade A infantry soldier, as well as a mechanic. He has to serve overseas in all climates and he is often called upon to defend his camp, or the aeroplane in which he has landed in hostile territory.

If the Halton Apprentice is rather more industrious and intelligent than the average he may go into the Air Force as a Leading Aircraftman. If he is still more intelligent and has a particularly good character he may be retained for a special course so that he goes and joins a station as a Corporal. And, if he is a boy of exceptionally high quality and obviously of good class, and has real intellectual ability, he may be given a cadetship at the Royal Air Force College at Cranwell, where, after a two year course, he will be given a commission.

Already several of the apprentices from Halton who have been given cadetships have come out right at the top of their course at Cranwell and others have come out very near the top. The oldest of them is still too young for anyone to guess at what his future career may be. But those who have become officers in squadrons are at least on a level in every way with the best of their contemporaries who went straight into Cranwell as cadets. And they give every promise of being most valuable officers.

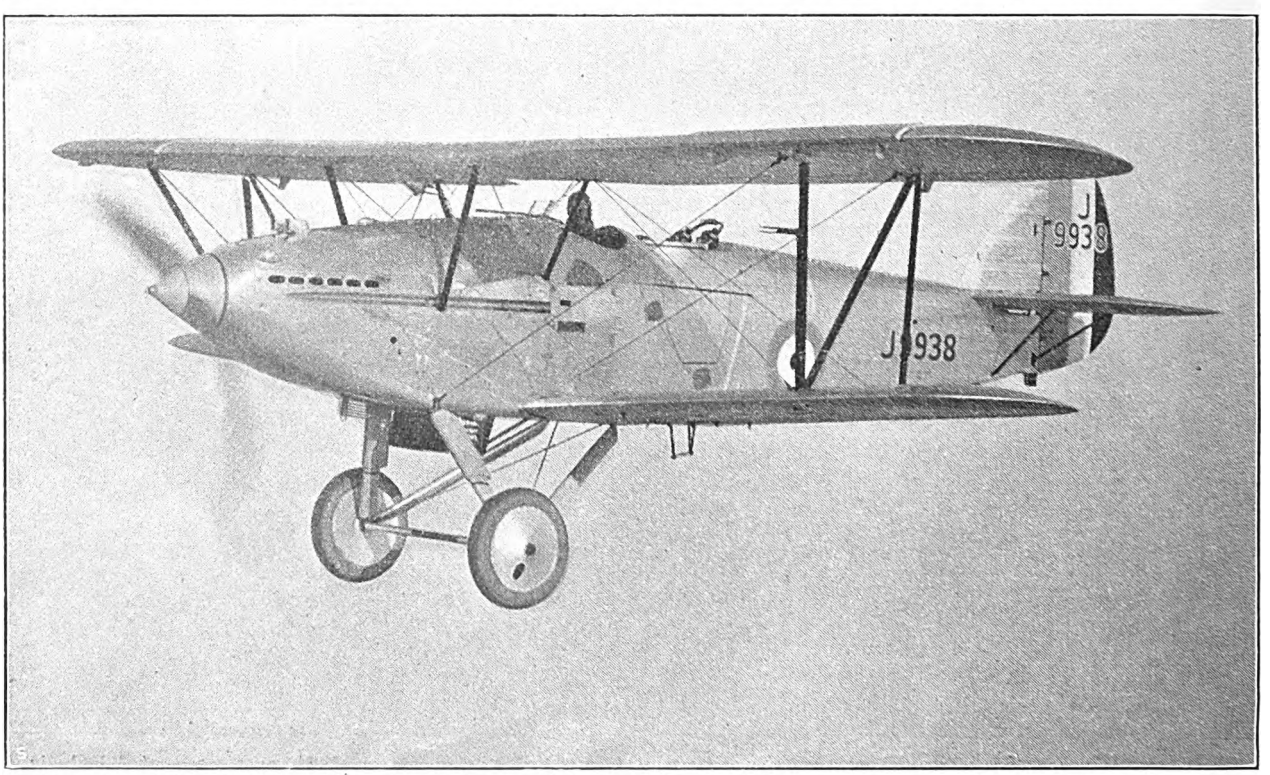
Thus impoverished gentlefolk need not hesitate to send their sons to Halton if they cannot afford to send them to Cranwell.

The Halton apprentice who does not qualify for a cadetship still has every prospect of doing well for himself in the aircraft business. After serving his twelve years in the Air Force he passes out into civil life with a liability to serve for a further 8 years on the reserve. If he has used his time well in the Air Force he leaves it as a fully qualified aircraft workman. He may be a worker in wood or a worker in metal, he may be a wireless expert, he may be a photographer. He may even have qualified as a draughtsman or a designer.

Among one's own acquaintance there are men who are doing very well indeed in the wireless trade as a result of their training in the Air Force, and there are photographers who are probably doing much better in civil life than they would have done if they had gone into an ordinary photographer's shop as boys to learn the business.

Besides that, these men have served overseas. They know foreign countries. They have the knack of judging their fellow-men because they are themselves men of the World. In fact, in every way a young man who comes out of the Air Force after having served the regulation time, if he has any good in him at all, is a better man for the time he has spent in the Service. And his Air Force record is a permanent testimonial to his character when he is applying for a job anywhere.

Admittedly there are certain heads of firms, mostly older men, who remember pre-war soldiers and sailors who were the bad boys of the family, and often took to drink, along with other bad habits, in the Services. Such men do not quite realise that the modern sailor or soldier or airman has a much better time of it and is much better educated while in the Service, than is any ordinary workman during those same rather critical years of a young man's life, when he either settles down to work or runs wild.



OUR NEWEST DAY BOMBER.—A Hawker Hart two-seat day bomber (Rolls-Royce "F" engine) flying above the fog over Brooklands.—(*"Aeroplane" photograph.*)

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Among the young men who are now in responsible positions in business there is quite a distinct tendency to take men out of the Fighting Services when their time has expired because they have learned the habits of discipline, and because a proper check on their character while in the Service can be got. Actually, one has heard a former Army officer, who is very much a man of the World, say that the ordinary private in the mechanicalised branches of His Majesty's Services to-day is all round a better educated man than were most of the officers at the time when he himself had the honour of serving in the Army. And certainly the young airman of to-day who has been to Halton, and has thereafter served in various parts of the World, in considerably better educated than is the average young man starting life under the same circumstances as he did.

Therefore, the youngster who is really determined to get into the aircraft business and does not mind devoting twelve years of his life to making himself fit to hold a really good job afterwards, will probably do much better to go into the Air Force through Halton and work steadily all the time, than to go into any ordinary workshop and hope to get from that into a responsible position in the Aircraft Industry.

The Civilian Mechanic.

There are, however, many imaginable reasons why a boy who is keen on aviation may not be able to go into the R.A.F., or may not want to go into the R.A.F.

Such a boy may get into the Aircraft Industry in either of two ways. He may, with luck, get himself taken on as a boy-apprentice without a premium at a very small wage until he has served whatever is fixed as the proper period of apprenticeship in the particular factory in which he is engaged.

He will probably have to start by sweeping the floors and cleaning down the machinery. At first that may not appeal to him as a way of becoming either a great aviator or a great commercial man in aviation. But, it will do him a power of good.

The greatest fault in the modern system of apprenticeship is that the apprentices are so well-treated, compared with the way in which their elders behaved to them in the days of one's own youth. In these days even to speak gruffly to an apprentice seems to be almost a legal offence. But, one cannot help feeling that an opportune clout on the ear, or the judicious application of the toe of a boot, to an obstinate or impudent apprentice had a very much better effect on his moral character afterwards than have all the molly-coddle methods of the present day.

Possibly highly-strung nervous youths did suffer from what are now regarded as brutal and bullying methods. But for one boy who broke under such treatment, a dozen were made into men,—which they would not have been if they had been allowed to run loose without a heavy disciplinary hand.

Quite apart from that there are numbers of youngsters who are naturally of a brutal character and do not respond to anything other than brutal treatment. And, unless they are educated by physical force, they may become undisciplined young Bolsheviks of precisely the kind who give most trouble in all industries to-day.

Anyhow, the mother of a well-brought up boy to-day need have little fear that he will suffer physical or moral deterioration by being sent as an apprentice to an aircraft factory. The greatest difficulty of all is to find an aircraft factory which will take apprentices.

There is, necessarily, a limit to the number of apprentices that can be taken by any given factory. Quite apart from Trade Union Rules about the number of apprentices that may be taken in proportion to the number of men employed in a factory, there is the obvious limitation that a Works Manager cannot have his factory lumbered up by a lot of more or less badly disciplined young hooligans, or, as they are called in these days, high-spirited youths, who cannot be driven to work if they do not feel like working. So the only thing for the worried parent to do is to write to firm after firm till one is found where there is a vacancy. And, remember, a boy may very well start with a firm which makes aircraft material or parts but does not make aircraft complete, and transfer from that firm, after he has served his time, to an aircraft firm as a specialist in his own line.

In The Factory.

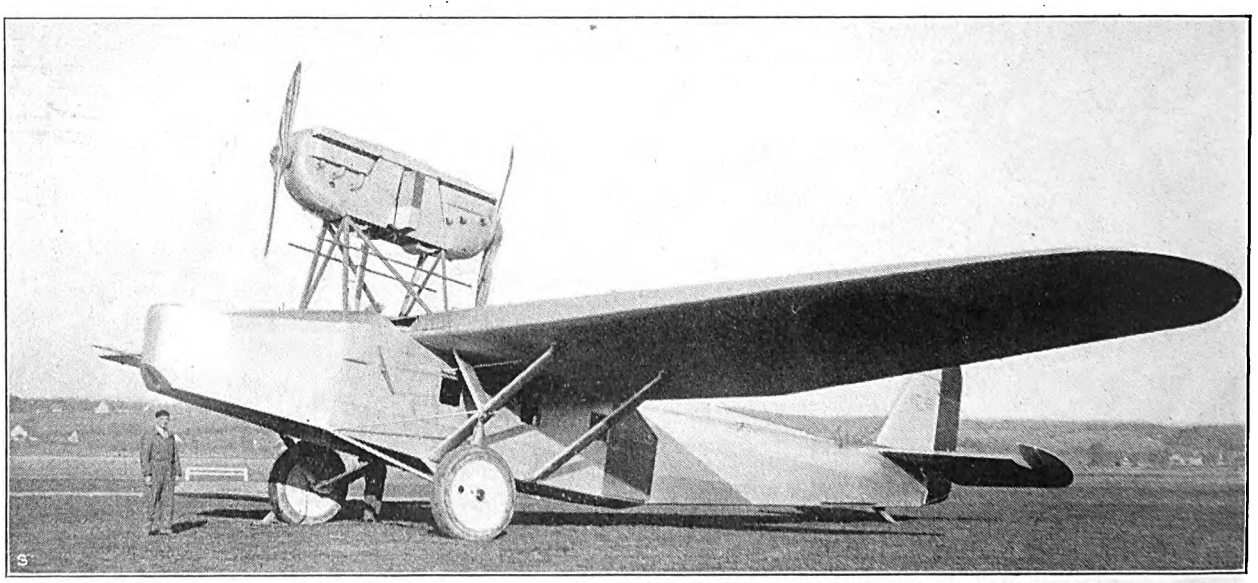
Nevertheless, an apprenticeship with a decent aircraft firm is a very good way, in fact it is the best way, of getting a footing in the Aircraft Industry. But here, as with boys who go to Halton and enter the Air Force, the youngster must not expect to be put onto what he himself regards as interesting work as soon as ever he joins the firm.

Probably the schoolboy's idea of going into an aircraft factory is that as soon as he arrives he is put onto the job of doing work on the actual aeroplanes themselves, and that he will be able to play about on the aerodrome and watch them start and alight, that he will be able to handle them in the sheds, and quite possibly, if he is lucky, get an occasional flight with one of the pilots or owners.

What will probably happen to him will be that he will spend all his time in a workshop, except when he is hurrying to work in the morning and home at night, and that he will be on some deadly repetition job, doing the same thing day after day for months on end, and that the only wheels he will ever see going round will be those of the machinery. He may not lay a hand on a complete aeroplane for three or four years.

Probably one is not far wide of the mark in saying that the majority of hands in aircraft factories know very little about aeroplanes and care even less, so long as the firm sells enough aeroplanes to pay their wages. Only recently, the son of one of our pioneer aircraft designers and manufacturers, who is himself serving his time in one of our biggest and best aircraft factories, told one that he was quite disgusted with the ignorance of aviation among the men among whom he worked. He says that they are quite good workmen, but most of them would be just as useful making bottles or bedsteads or anything else as at making aeroplanes, and they would be just as little interested in the main idea of their job,—though they are interested in doing their own little bit of work well. He said that none of them ever read aviation papers, and never even read ordinary engineering papers which would make them wiser and better men at their own individual work.

That is just one of the curious human facts for which the keen and intelligent youngster who wants to get on in aviation, ought to be most thankful. Those of us who are fully conscious of our own mental limitations never cease to be thankful because the great majority of our fellow-



A SWISS BOMBER.—The Comte A.C.3 twin-engined bomber monoplane (two 600 h.p. Hispano-Suiza engines). This machine is of Swiss design and construction throughout, with the exception of the engines, and is the **first of a series to be produced for the Bolivian Government.**

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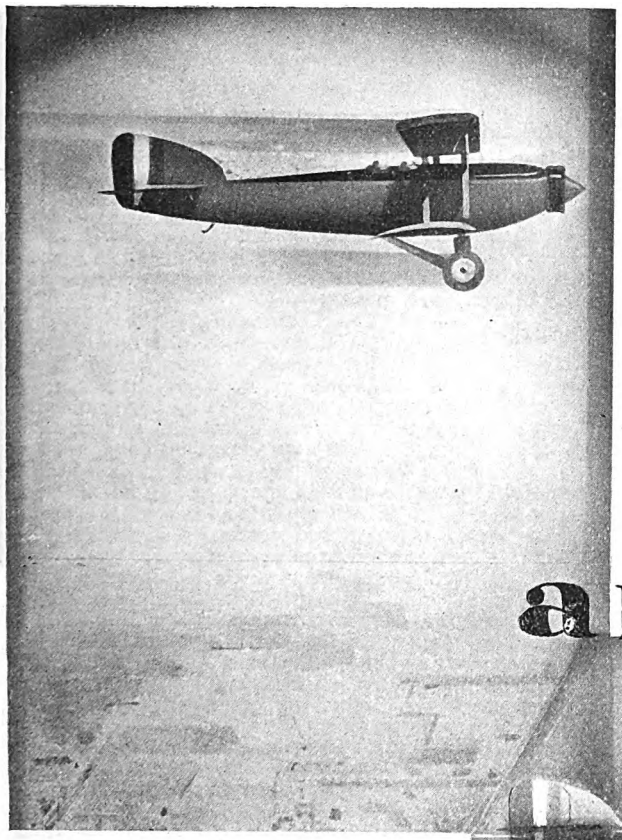

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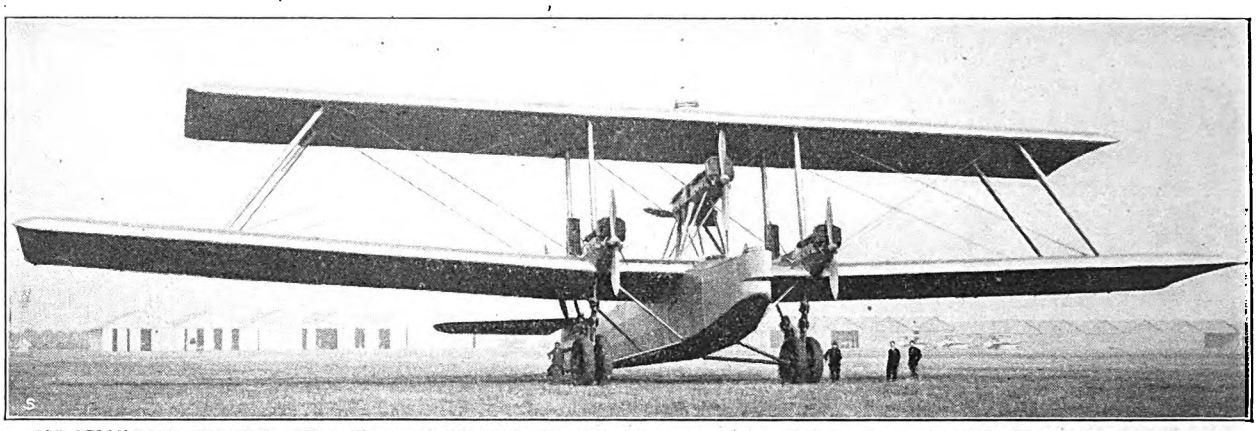


AN ITALIAN GIANT.—The Caproni 90 P.B. bomber biplane (six 1,000 h.p. Isotta-Fraschini Asso-1,000 engines). This machine has a span of 164 ft., a length of 98 ft. and a height of 40 ft.

creatures are even more stupid than we are ourselves. If things were otherwise we should not be able to make a living, or we should only make a very poor one in a very subordinate position.

The boy who goes into an aircraft factory and sweeps floors and cleans machinery may ultimately develop in any direction. He may become an expert machinist, he may become an expert toolmaker. But those occupations are just as useful in any other branch of engineering.

If he applies himself hard to his job, and if he studies in his spare time, then with his workshop knowledge, and the theoretical knowledge which he has learned in his spare time, he may get himself promoted to the design side and be given a job in the drawing office. Then he will find his workshop knowledge most useful, because he will not make the mistake which is so common among designers, of designing a beautiful thing which simply cannot be made by any human hand or human-made machinery.

The Untrained Designer.

During the war one came across perfectly marvellous examples of design by Government experts at what was then called the Royal Aircraft Factory at Farnborough. They used to send drawings out to the Aircraft Industry for these things to be made and embodied as standard fittings in aircraft built to the designs of the Royal Aircraft Factory. And they used to be quite surprised when manufacturers sent them back and said that the things could not be made. And, much to one's surprise, a very experienced aircraft designer told one only a day or two ago that some of his bright young men in his own design department quite often brought him designs for aeroplane details which looked quite pretty till he came to consider how the factory was going to make them. And then he found that they were unmakeable.

There is, apparently, quite a new generation of young men in design departments who were too proud to go into the workshops and learn their jobs first, but have preferred to belong to what the manual worker calls contemptuously the "black-coat" class, and have gone straight into drawing offices after having been educated at the local polytechnic or something of that sort.

These young men are apt to be more trouble than they are worth, and cost more in wages than they are likely to earn. The worst of it is that some of them are quite brainy youths who can handle figures cleverly, and are remarkably good draughtsmen considered purely as draughtsmen.

For this reason, one recommends boys who are thinking of going into the aircraft business to put in a couple of years at least in the workshops making things before they try to get into the design department and design things for other people to make.

The Commercial Mind.

There is another class of youth who has quite a chance of doing well in the aircraft business besides the one who goes into the Air Force or who goes into the Workshop. That is the youngster who is deadly keen on aviation and happens to have a gift for commercial affairs.

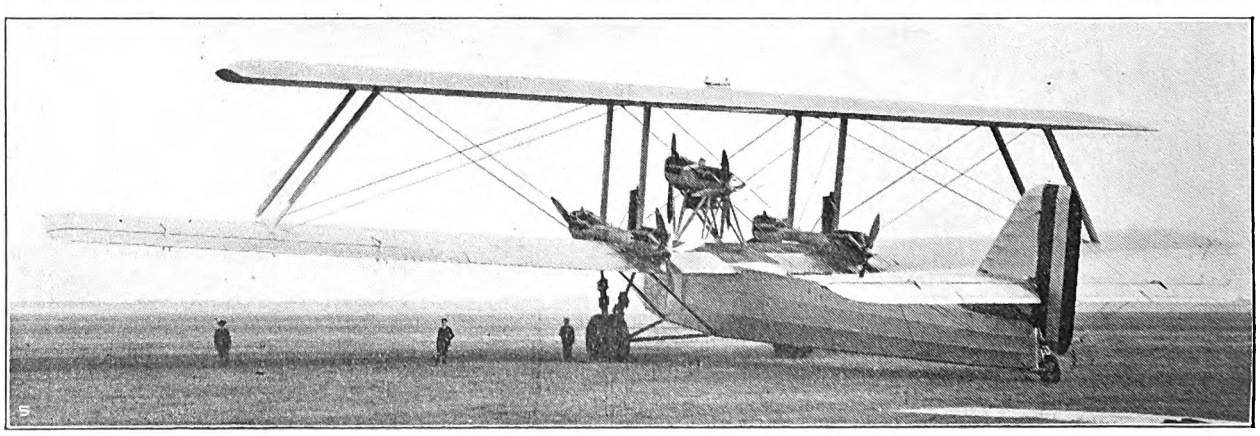
Such a boy can quite well start by going into the office of an aircraft factory simply as an office-boy to lick stamps and fold letters and run messages. If he is hard-working and intelligent he can graduate from that, especially if he takes a little trouble and goes to a night-school, or something of that sort, into being a clerk.

In that job he should, if he is wide awake, get to know quite a lot about his own firm's business and about the business of other firms with whom his firm deals. Also he ought to pick up a lot about dealings with Government Departments, whether his firm sells material to the Air Ministry and so brings him into touch with the Contracts Department, or whether his firm sells to civilian buyers and he only comes in touch with the Air Ministry as a blight on the firm's life which prevents it from selling any old kind of aeroplane to the public without let or hindrance in the form of inspection and certificate.

In either case, a really intelligent lad ought to pick up enough commercial experience, and at the same time ought to learn enough about the inside working of the Aircraft Industry, in the course of five or six years, to fit him for a fairly responsible position on the commercial side of aviation.

One of the most difficult things is to find anybody who is a competent commercial man and, at the same time, has any knowledge of, or interest in, aviation as such. A competent commercial man is always a difficult thing to find. There is more truth than people think in the oft-repeated phrase that one of the most difficult things to find is a business man who is worth anything between £2,000 and £10,000 a year.

There are plenty of commercial men who are worth anything between £2 a week and £6 a week. But the better the job the more difficulty an employer finds in getting a man to fit the job. Therefore, an intelligent boy who takes a keen interest in business always has a chance of getting on. And as the aircraft business is the one busi-



AN ITALIAN GIANT.—Another view of the Caproni 90 P.B. bomber. The location of a gunner's cockpit in the top plane is interesting, although it is not original.

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Sqdn. Ldr. Hinkler, A.F.C.

England—Australia.
12,000 miles.
Capt. Lancaster.

England—S. Africa.
8,000 miles.
Lt. Murdoch.

South Africa—
England.
8,000 miles.
Lady Heath.

England—
Gold Coast.
5,000 miles.
Capt. Rattray.

England—
South Africa.
8,000 miles. Lt. R.
R. Bentley, A.F.C.

England—
S. Africa.
8,000 miles.
Lady Bailey,
D.B.E.

Britannia Trophy.
1927. Lt. R. R. Bentley,
A.F.C. 1928. Sqdn. Ldr.
Hinkler, A.F.C. 1929.
Lady Bailey, D.B.E.

England — India.
5,500 miles.
Capt. T. H. Stack,
A.F.C. 1—
and Mr. B. Leete.

King's Cup Air Race.
1926. Capt. H. Broad.
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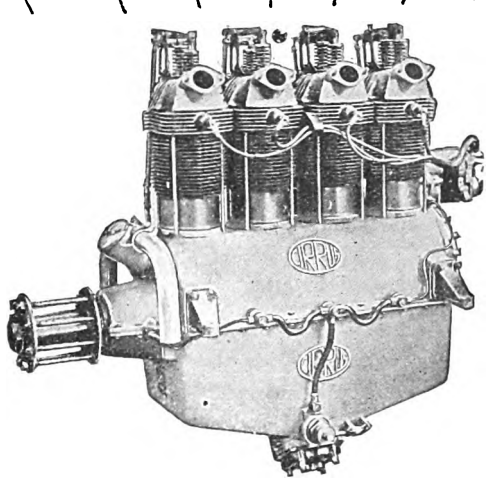

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ness in the World which is likely to grow quickest, the Aircraft Industry is best worth attention.

Naturally the great difficulty is to find a firm which has a vacancy. That is too true in any walk of life. Probably there is just as much difficulty in finding a job as office-boy in a tobacco shop or in a lawyer's office as there is in finding a similar job in the office of an aircraft factory or in a general engineering office or a ship-building office. But naturally, there are more jobs going in a trade which is booming than in a trade which is dying. And though, there is not at the present moment, a boom in aircraft, there is at any rate, an increasing volume of employment. And that is the intelligent boy's chance.

One would never advise a modern father to deny himself and his wife a new car or anything of that sort just so that they may pay little Willie's premium as an apprentice in an aircraft factory. Little Willie will do far better if he is sent in as a non-premium apprentice and has to start at the same hour of the morning as the other workmen start and has to live the same life as they live. The only thing that the parents need do is bring him home frequently for week-ends so that he may be brought into touch constantly with young people of his own social status and may learn, or rather retain, the social usages of his own rank in Society.

DISTINCTIONS AND DIFFERENCES.

Incidentally, one may remark that on matters of social usages, table manners and so forth, the average workman of to-day is considerably more strict than are the families of what are commonly called the "upper classes." Not only so, but social distinctions between different grades and different classes of "workers," as some of those who work 40 hours a week prefer to call themselves to distinguish themselves from those of us who only work all the time we are awake, are much finer and much more snobbish than are those among the ordinary professional classes.

Nevertheless, the boy who is born into and brought up in what we generally call the "professional classes," may just as well keep in touch with his own class and keep himself accustomed to their social tricks and manners and actions.

But, so far as learning his job is concerned, the more he works alongside the ordinary manual worker the more he will learn. Therefore, one is all against premium apprenticeships. And one is equally against specialised courses in technical education, till a youngster has shown a special talent in one direction.

Naturally, if a youngster has a natural taste for mathematics, then he may as well go to a college or a school of science or something of that sort and become a mathematician, and deal with the theories of Doctor Prandtl and with Boundary Layers, and with Rotary Derivatives, and things like that. If his mind runs that way he will never make a first-class workman or a first-class production engineer, or a works-manager at a few thousand a year, or anything of that sort.

He will probably turn into a professional mathematician, in which case he may be worth £200 or £300 a year at the age of 30, and may, with extraordinary luck, be a college professor of some kind at the age of 40 with £500 a year. Being a high-brow scientist is not quite such a well-paid job as being a good taxi-driver. And though one is against encouraging young men to become professional pilots,—because sooner or later, the professional pilot will be only an aerial chauffeur,—one would always rather encourage a young man to be a professional pilot than encourage him to be a professional mathematician. A first-class pilot may become a professional test pilot and be able to knock up anything between £1,000 and £2,000 a year as an expert adviser on the behaviour of new types of aircraft. There may be professional mathematicians who can pick up a similar sum as experts in their own line of business, especially if they have the gift of tongues and can make speeches and become consulting experts. But between that and the lowest paid members of the two professions, the bulk of the members of those professions will be found somewhere around the £300 a year mark. And of the two probably the professional pilots are doing the better work for the World as a whole.

PROSPECTS.

The youngster who is really keen on aeronautical engineering, and does not mind doing a workman's job for the first three or four years at least, and is willing to spend most of his spare time educating himself, really has much better prospects than most young professional men to-day.

All branches of engineering are over-crowded. Some branches of engineering are decaying. Some few branches of engineering are increasing.

Some, for example shipbuilding, are neither increasing nor decreasing. Electric tramway engineering must be decreasing badly, judging by the number of tramlines that have been pulled up to be replaced by motor 'bus lines. Motor-traction engineering is probably increasing. Railway engineering is just about stationary. But of all branches of engineering, that which holds out the brightest prospect is undoubtedly aeronautical engineering.

There is not enough of it yet to absorb anything like the number of young men who are keen on becoming aeronautical engineers. But, when the boom in aeronautical engineering does come, as it must come within the next five years, and when air lines are being established all over the World, just as railway lines were built in this country in or about 1840 to 1860, then there will be a much greater demand for competent aeronautical engineers than in any other line of engineering.

So for that reason alone, the parents of any intelligent boy between the ages of 14 and 18, or even 20, who is really keen on becoming an aircraft engineer will be thoroughly justified in encouraging that boy in his natural bent. And such a parent will be justified in spending a certain amount of money on having that boy educated in that line of business so that when he goes into the workshop he will know a little more than the men alongside whom he works.

So far we have discussed the chances of boys whose parents are quite poor. They may be the intelligent sons of poor but respectable parents, or they may be the sons of poor but dishonest parents,—of the two the latter may even be the more intelligent boys. Dishonesty is not necessarily hereditary and, in any case, there is a very fine margin between, for example, the great financier and the embezzler, or the great artist and the expert forger. Historically one of the greatest engravers of the early nineteenth century was hanged as a forger. And the son of a forger or of an artist may inherit his father's facility of hand and eye without inheriting his moral kink. This is said advisedly because the clever artist who is ineffectual is just as much a moral blot as is the skilled forger. And the son of either may become an extremely useful member of society in connection with aviation.

(*To be continued.*)

THE SOUTHERN RAILWAY AND AIR TRANSPORT.

THE AEROPLANE for Apr. 24, 1929, announced that the Bills, promoted by the railway companies to empower them to provide air transport services were unanimously passed on Apr. 16-17, 1929.

On Feb. 27 of this year, at the annual meeting of shareholders, the Chairman of the Southern Railway, the Hon. Everard Baring, made the following announcement:

"The Southern Railway have acquired a shareholding interest, but not a controlling interest, in Imperial Airways, and have agreed that, should they wish to run air services under the air powers obtained last year, such services will be operated by Imperial Airways. The companies mutually recognise each other's natural desire to develop their own services, and they agree to be mutually helpful in through bookings, display of literature and similar matter."

This seems a sound combination. The Southern Railway assure for themselves the aid of our most experienced air transport company—Imperial Airways. The possibility of any immediate result seems unlikely. The conditions in this country are not similar to those in America, where there exists close co-operation between the air lines and the railways, in which the latter are used for night travel on the long Transcontinental route.

One would suggest a flying-boat service between Southampton and the Channel Islands. This would allow a week-end service to the Channel Islands, which is at present an impossibility, and would provide the Southern Railway with a new week-end resort.

THE ROYAL AERONAUTICAL SOCIETY.

The Annual General Meeting of the Royal Aeronautical Society will be held in the Library at 7, Albemarle Street, W.1, at 6.30 p.m., on Tuesday, Mar. 25.

On Feb. 10, at 17.30 hours, Herr Martin Wronsky will lecture on "Air Transport" before a joint meeting of the Royal Aeronautical Society and the Institute of Transport. Particular attention is drawn to the facts that this lecture is *one hour earlier than usual,* and that the place is the Institution of Electrical Engineers, Victoria Embankment.

Herr Wronsky is one of the leading authorities in Germany on air transport and that the German air lines are forming a network over Europe is largely due to his energies, initiative and organising genius.

The lecture which was to have been read by Professor Nansen on Mar. 14 on "The Aims and Objects of the Aeroarctic" has been postponed as Professor Nansen is confined to bed with an attack of phlebitis.

THE R.38 MEMORIAL PRIZE.

The R.38 Memorial Prize of the Royal Aeronautical Society has been awarded for 1929 to Miss Hilda M. Lyon, M.A., A.F.R.Ae.S., for her paper entitled "The Strength of Transverse Frames of Rigid Airships." This paper will be published in the Journal of the Society.

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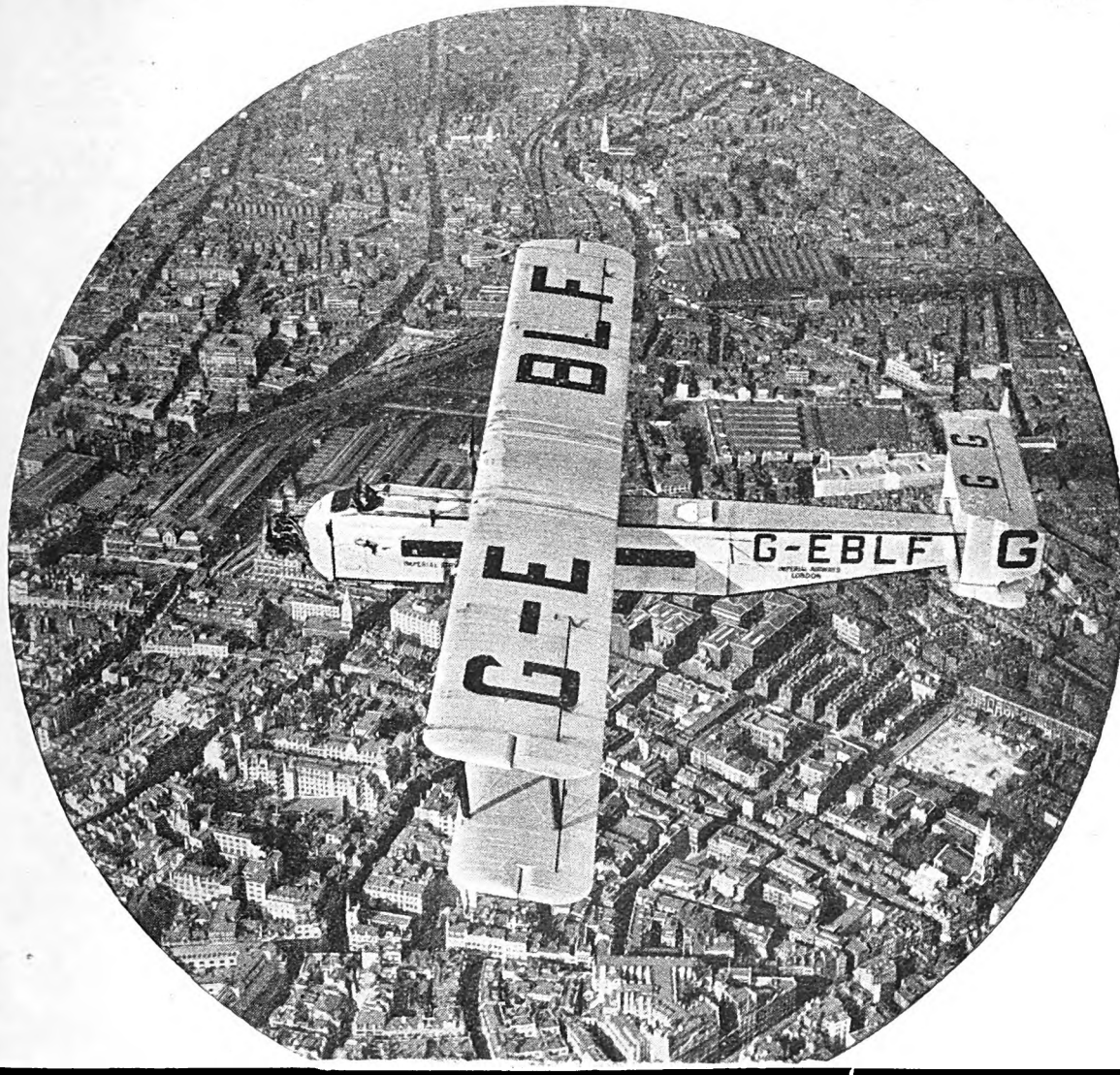

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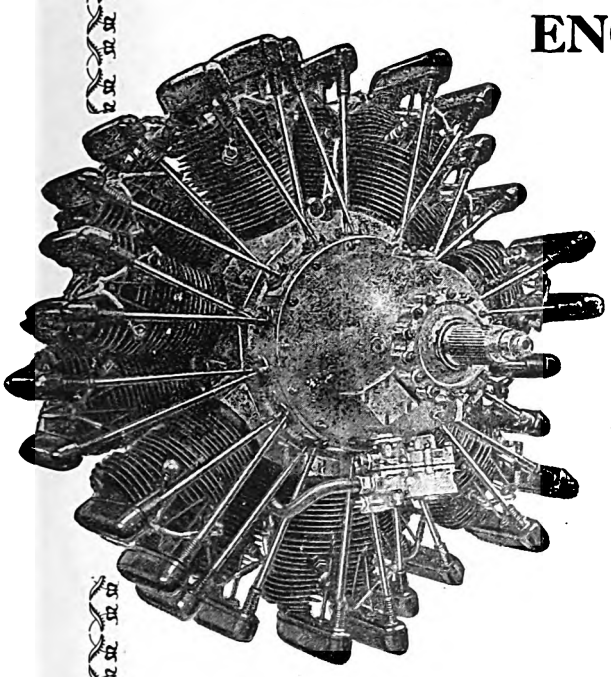

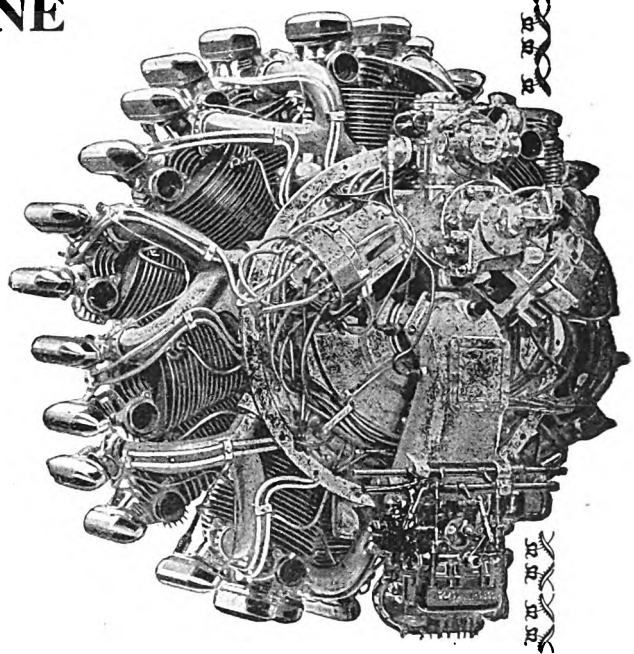

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THE ROYAL AIR FORCE.

The London Gazette.

Air Ministry, February 25.

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—Plt. Off. on probation A. T. Wilson is confirmed in rank (Feb. 2). The following Plt. Offs. are promoted to the rank of Flg. Off.:—J. Addison (Oct. 13, 1929); J. K. Flower (Jan. 14); E. M. F. Grundy, A. L. Weait, N. E. White, C. V. J. Pratt (Jan. 28); J. A. H. Louden (Jan. 30); S. S. Mackay (Feb. 24).

Flg. Off. V. H. Nicolay takes rank and precedence as if his appointment as Flg. Off. bore date Jan. 9.

Group Capt. E. F. Briggs, D.S.O., O.B.E., is placed on the retired list at his own request (Feb. 13); Flg. Off. N. S. Little is transferred to the Reserve, Class C (Feb. 26); Flg. Off. (Hon. Flt. Lt.) L. P. Winters relinquishes his S.S. comn. on account of ill-health (Feb. 13); the S.S. comn. of Plt. Off. on probation W. S. Moody is terminated on cessation of duty (Feb. 20).

ACCOUNTANT BRANCH.—The following Flt. Lts. are placed on the retired list at their own request:—F. R. Barton (Feb. 15); R. F. C. Metcalfe (Feb. 26).

MEDICAL BRANCH.—J. Murphy, M.B., B.Ch., is granted a temp. comn. as a Flg. Off. with effect from and with seniority of Feb. 3; Flt. Lt. J. P. Hederman, L.R.C.P. and S., is transferred to the Reserve, Class Dii. (Feb. 23); Flt. Lt. J. McM. Wilder, M.R.C.S., L.R.C.P., relinquishes his perm. comn. on transfer to the Indian Medical Service (Feb. 22).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—The following Plt. Offs. are promoted to the rank of Flg. Off.:—M. G. B. Clark (Feb. 11); M. F. Ogilvie-Forbes (Feb. 20); J. T. S. Horsfall (Feb. 22); E. J. Brighton (Feb. 24).

STORES BRANCH.—Flg. Off. R. Lamb is transferred from Class B to Class C (Sept. 30, 1929).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 601 (COUNTY OF LONDON) (BOMBER) SQUADRON.—The following Plt. Off. to be Flg. Off. (Dec. 25, 1929):—W. E. Windham.

Appointments.

Week ending March 3.

GENERAL DUTIES BRANCH.—Wing Commanders E. Osmond, C.B.E., to R.A.F. Practice Camp, North Coates Fitties, to command, 8/3. G. G. H. Cooke, D.S.C., A.F.C., to H.A.D., Henlow, for Administrative duties, 5/2. C. H. Nicholas, D.F.C., A.F.C., to H.Q., R.A.F., India, for Air Staff duties, 20/1.

Squadron Leaders H. I. Hanmer, D.F.C., to No. 504 Sqdn., Hucknall, 10/2. L. G. S. Payne, M.C., A.F.C., to No. 7 Sqdn., Worthy Down, 21/2. V. Buxton, O.B.E., to A. and G. School, Eastchurch, 14/2. O. G. W. G. Lywood, O.B.E., to H.Q., Coastal Area, 17/2. E. R. Whitehouse, to E. and W. School, Cranwell, 16/2. H. G. Crowe, M.C., to Air Ministry (D.O.S.D.), 1/2. R. H. Kershaw, to No. 202 Sqdn., Malta, 28/1. R. C. Hardstaff, to H.Q., 'Iraq Command, 21/1. A. H. Stradling, O.B.E., to No. 1 F.T.S., Netheravon, 17/2. J. W. Woodhouse, D.S.O., M.C., to No. 55 Sqdn., 'Iraq, 24/1. J. G. S. Candy, D.F.C., to Air Ministry (D. of E.), 20/3.

Flight Lieutenants E. T. Carpenter, A.F.C., to Station H.Q., Tangmere, 17/2. V. H. Tait, to H.Q., R.A.F., Middle East, 11/2. J. Glover, to No. 2 Armoured Car Company, Palestine, 11/2. G. H. Stainforth, to H.Q., Fighting Area, Uxbridge, 17/2. F. C. T. Rowe, to No. 1 School of T.T. (Apprentices), Halton, 10/2. J. H. Winch, to H.A.D., Henlow, 18/2. E. R. C. Hobson, D.F.C., to Air Ministry (D.O.I.), 10/2. H. G. Rowe, D.F.C., to Station H.Q., Heliopolis, 21/1. F. J. Fogarty, D.F.C., to No. 601 Sqdn., Hendon, 3/3. C. H. A. Stevens, to H.Q., Coastal Area, 24/2. C. W. McK. Thompson, to A.A.E.E., Martlesham Heath, 24/2. A. H. Beach, to No. 4 F.T.S., Middle East, 21/2. J. C. Belford, to No. 2 A.C.C., Palestine, 21/2.

Flying Officers E. T. Kingsford, to No. 4 F.T.S., Middle East, 21/2. H. V. Smith, D.C.M., to R.A.F. Depot, Uxbridge, 17/1. L. C. Bennett, to No. 4 F.T.S., Middle East, 11/2. E. C. T. Edwards, to No. 600 Sqdn., Hendon, 14/2. R. C. Wilson, to No. 47 Sqdn., Middle East, 5/2. J. N. Young, to R.A.F. Depot, Uxbridge, 7/1.

Pilot Officers—The undermentioned are all posted to No. 4 F.T.S., Middle East, with effect from 21/2: R. V. Alexander, N. H. Bantoft, J. Boston, H. M. Bowes-Lyon, H. F. Clayton-Daubeny, E. J. P. Davy, W. G. Eatherley, B. E. Lowe, T. J. Macinerney, J. G. Mansfield, P. W. E. Ryland, U. Y. Shannon, R. M. Smith, J. B. T. Whitehead.

MEDICAL BRANCH.—Flight Lieutenant R. H. Stanbridge, to R.A.F. Depot, Uxbridge, 14/2.

Flying Officers O. G. Harold, to R.A.F. General Hospital, 'Iraq, 19/1. A. Sheehan, to R.A.F. General Hospital, 'Iraq, 19/1. G. O. Williams, to No. 100 Sqdn., Bicester, 20/2.

STORES BRANCH.—Flight Lieutenants H. E. T. Crocker, to H.Q., 'Iraq Command, 18/1. T. S. James, to Aircraft Depot, 'Iraq, 18/1.

Flying Officers R. H. Clay, to No. 2 F.T.S., Digby, 1/3. J. W. Hunt, to R.A.F. Depot, Uxbridge, 1/3.

Pilot Officer H. H. Hilliar, to School of Naval Co-operation, Lee-on-Solent, 13/2.

ACCOUNTANT BRANCH.—Squadron Leader O. C. J. Croydon, to No. 205 Sqdn., Singapore, 21/2.

Flight Lieutenant R. F. C. Metcalfe, to R.A.F. Depot, Uxbridge, 11/2.

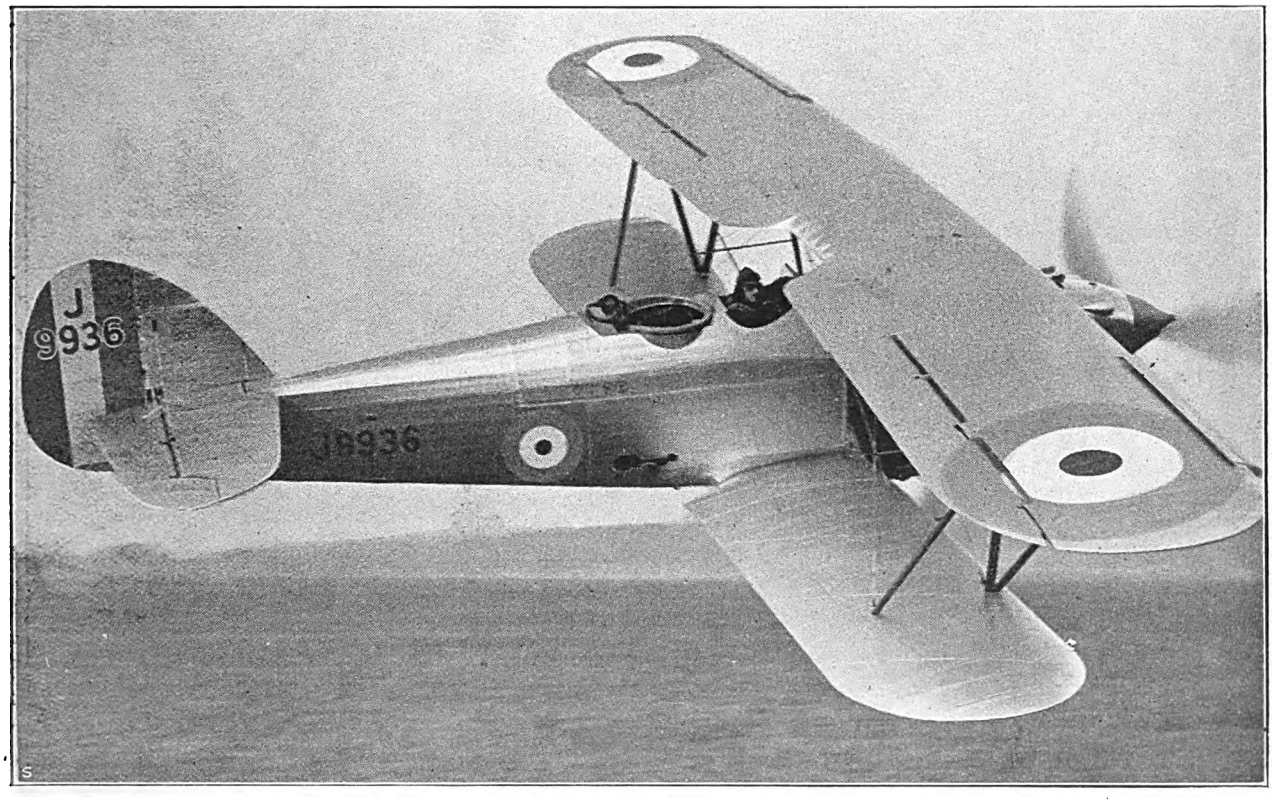
The Imperial Defence College.

The Air Ministry announces that Air Vice-Marshal Sir R. Brooke-Popham, K.C.B., C.M.G., D.S.O., A.F.C., R.A.F., has been selected for appointment as Commandant of the Imperial Defence College, in succession to Major-General W. H. Bartholomew, C.B., C.M.G., the present Commandant, who will vacate the appointment at the end of December, 1930.

The appointment is at present for a period of two years, and is filled by each of the Services in turn.

Air Vice-Marshal Sir Robert Brooke-Popham was born at Mendlesham, Suffolk, in 1878, the son of the late Henry Brooke, of Wetheringsett, and was educated at Haileybury and Sandhurst. He assumed the additional surname of Popham by Royal Licence in 1904.

He was appointed to a commission in the Oxford and Bucks Light



POSTED.—A Hawker Hart day bomber (Rolls-Royce "F" engine) leaving Brooklands for Eastchurch, where it was handed over to No. 33 (Bomber) Squadron, R.A.F.—(*"Aeroplane" photograph.*)

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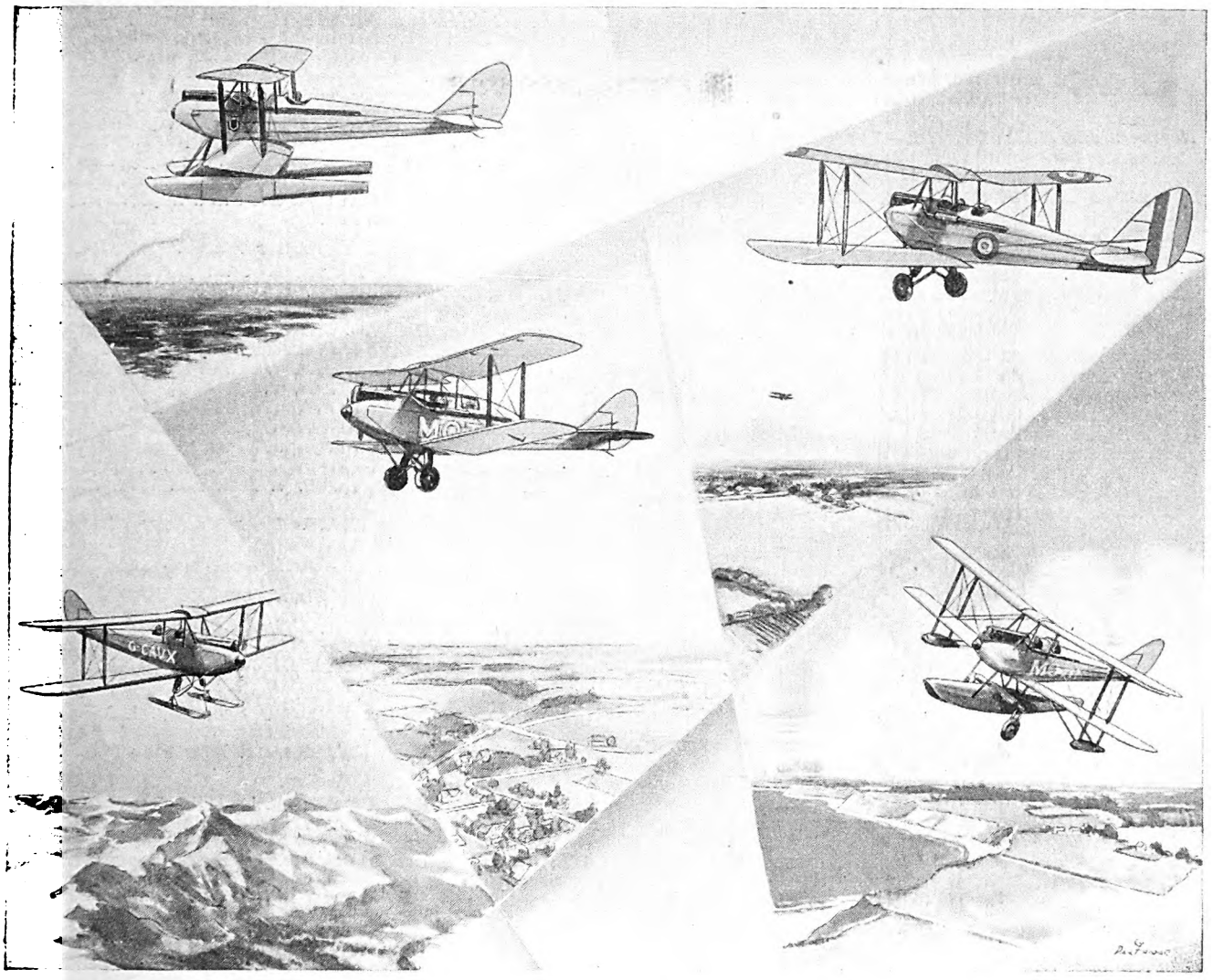

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admission to the ground) may be had from Mr. H. E. Woolway, Room 649, Air Ministry, Kingsway, W.C.2. Applications should be accompanied by cheques made payable to the hon. Treasurer, R.A.F. Rugby Union.

The Inter-Unit Rugby Cup.

The results of the third round ties in the R.A.F. Inter-Unit Rugby Football Challenge Cup Competition are as follows:—

Northern and Midland Areas:—Catterick beat Donibristle, 17 points to nil; Sealand beat Henlow, 9 points to 5.

South Eastern and South Western Areas:—Eastchurch and Manston drew, no score; Gosport and Andover drew, 6 points all.

The Northern semi-final tie will be played at Grantham on Mar. 5. The Southern semi-final tie has been fixed, provisionally, for Mar. 12 at Uxbridge.

The Final will be played at Uxbridge on Mar. 26.

Rugby Football.

R.A.F. versus Oxford University:—The R.A.F. were beaten by Oxford University at Halton on Feb. 26, by two goals (10 points) to a try (3 points). The game was fast and vigorous and the tackling on both sides was particularly keen but the R.A.F. lacked a fraction of drive in the tight scrums and a good deal of finish in the back division.

Oxford got the ball six times out of seven from the scrums and in the line-outs but in spite of this handicap the R.A.F. backs seized many opportunities and only failed to score through bad handling and lack of judgment. Elsmie was sound and enterprising at scrum-half and was responsible for some of the most beautiful tackling of the game. Odbert made some excellent breaks but his handling was poor and he invariably hung onto the ball until it was too late. The threequarters, on the other hand, handled well but failed to make ground.

The only Air Force try was scored by White who in his third attempt to get through on the right wing took a beautiful pass from Odbert and, with a fine burst of speed, scored. Another new player on the R.A.F. side who showed great promise was Slocum, who played an excellent game at inside threequarter. Ievers at full back was reliable and made one great run down the wing which, if he had been supported, should have ended in a try.

The team were without Constantine, Franks and Maxwell, from among their regular forwards, and Llewellyn from the backs. The last named is still lame from an injury in the match against the United Banks.

In spite of the fact that Oxford were getting the ball out of the scrum and were showing much better combination among the backs twenty-five minutes had passed before they were able to score. Then a bout of short passes were exchanged near the R.A.F. line and Hall crossed over with an inward pass from King. Good movements in which Elsmie and Slocum were conspicuous took the ball into Oxford territory but erratic handling prevented a score.

The Air Force forwards made some good bursts with the ball at their feet but still the Oxford defence held and they were driven back. Odbert sold a double dummy and made ground but Pott who took the pass was too slow and was brought down. Ievers then fielded a high kick and, with a fine swerve ran nearly the length of the field. The supporting forward dropped the ball and the Oxford back cleared.

Oxford pressed in the first part of the second half and Ievers, Elsmie and McKechnie, in turn saved the situation. The second Oxford score came from a skilful manœuvre between Alexander and Mackay, Henley again converting. Kerby led a forward attack down the field but was driven back and then Pott, White and McKechnie combined to gain fifty yards for the Air Force. A bit of smart heeling by the R.A.F. forwards and a clean pass by Elsmie got Odbert away for White to score the only Air Force try. The goal kick failed.

The R.A.F. cheers for the winners were supported by a mighty roar of applause from over two thousand Aircraft Apprentices who had been keen and impartial spectators of the match.—C. M. MCA.

Sports Fixtures for March.

Boxing:—6th R.A.F. Individual Championships at Uxbridge; 7th, R.A.F. College v. R.M.C. at Sandhurst; 27th and 28th, I.S.B.A. Championships at the Stadium Club.

Fencing:—7th, R.A.F. v. Sabre Club at Bertrands; 14th, R.A.F. v. Lensbury Club at Lensbury Salle; 19th, R.A.F. v. Army at Aldershot; 27th, R.A.F. v. R.A.C. at the R.A.C.

Rugby Football:—8th, R.A.F. v. Coventry at Coventry; 12th, R.A.F. v. Civil Service at Halton; 22nd, R.A.F. v. Army at Twickenham; 26th, Inter-Unit Cup Final at Uxbridge.

Hockey:—8th, R.A.F. College v. R.M.C. at Sandhurst.

Association Football:—15th, R.A.F. v. Army at Wimbledon F.C. Ground; 29th, R.A.F. v. R.N. and R.M. at Millwall.

Cross-Country:—26th, R.A.F. Cross Country Championships at Halton.

The R.A.F. Athletic and Cross-Country Association.

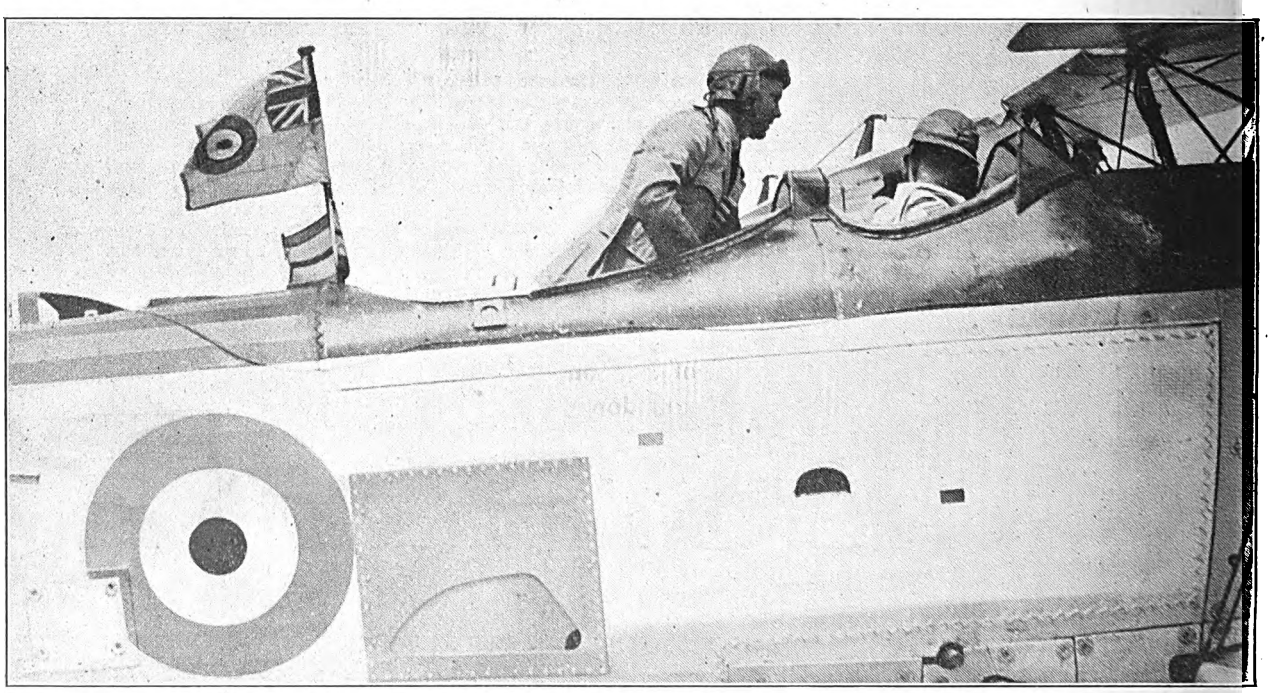
The R.A.F. Cross-Country Championships will be held at Halton on Mar. 26 at 15.00 hours. The race will be one of 6½ miles and will be open to senior teams (representing stations with an establishment of over 500) and junior teams (representing stations with an establishment of under 500).

Entries, giving number, rank, name and initials of competitors must reach the Honorary Secretary, R.A.F. Athletic and Cross Country Association, School of Physical Training, R.A.F. Depot, Uxbridge, not later than Mar. 12.

Hockey.

R.A.F. versus R.N.:—The R.A.F. beat the Royal Navy at Uxbridge on Feb. 26 by three goals to two. *The Times* account of the game states:—

With the ground in excellent condition the game was played at a great pace, especially in the second half, when the Air Force settled down to really effective hockey. In the earlier part of the game they relied too much on the short passing game and failed to use their wings enough, whereas the Navy forwards, well led by Kirkconnel, swung the ball about well and were always the more dangerous in their movements. But owing to the magnificent defence of the Air Force half-backs and Flying Officer Beisiegel at back, they were able to score only once in the first half, although they did most of the attacking. Afterwards, the Air Force played a far more open game and, with their half-backs giving them splendid support, they scored



THE FLAG SHIP.—Air Commodore A. G. Board, C.M.G., D.S.O., R.A.F., getting out of the Fairey III.F (Napier Lion engine) at Cape Town at the end of the outward journey of the R.A.F. 1930 Cairo—Cape Town—Cairo Flight. The flags are the R.A.F. Ensign and the Air Commodore's flag.

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three goals to their opponents' one. It was, however, only towards the end of the game that they obtained a winning lead, to the great delight of their supporters, who had turned out in full force. On the run of the play a draw would have been a very fair result, for, on the whole, the Navy forwards were the better balanced line. The Navy half-back line was little, if at all, inferior to that of the Air Force, and neither goalkeeper could be blamed for any of the shots that scored.

The R.A.F. team were:—

Cpl. C. Butler (Stanmore), goal; Cpl. Foreman (Sealand) and Flg. Off. W. K. Beisiegel (Donibristle), backs; L-AC. L. R. Hobbs (Uxbridge), Sjt. W. C. Maher (Upavon), and L-AC. Lodge (Worthydown), half-backs; Flg. Off. N. M. Jerram (Halton), Plt. Off. D. P. Lascelles (Tangmere), Flg. Off. H. E. Sales (Bicester), Flg. Off. S. C. Dufton (Bicester), and Flt. Lt. H. N. Hampton (Digby), forwards.

The Front Cover.

The front cover of The Aeroplane this week shows a flight formation of No. 47 (Bomber) Squadron, R.A.F., flying over the junction of the Blue Nile and the White Nile. At the time the photograph was taken the equipment of the Squadron was D.H.9as, but it has now been re-equipped with Fairey IIIF.s (Napier).

R.C.A.F. CIVIL FLYING IN 1929.

The following is a summary of the work done during the 1929 season by the Royal Canadian Air Force for the various services of the Department of the Interior.

Ever since 1919 there has been the closest co-operation between the Air Force and the Department of the Interior. Originally this Department's aerial activities were largely confined to forest patrol and aerial photography, but of late years it has been found that the aeroplane can be used by many other services in their scientific work and in the administration of Canada's natural resources.

The results obtained during the season of 1929 were more than usually successful in aerial photography. These aerial photographs are used not only for mapping but for water-power investigations, timber cruising and estimating, geological investigations, and various engineering purposes. In fact, the aerial photographs provide the means for assisting in a material way the ultimate analysis of the resources of a district. As an example an area of over 4,000 square miles was photographed in northern British Columbia for the purpose of taking stock of its natural resources. The preliminary reports indicate that this work was so satisfactory that a wide field of usefulness has been opened up for aerial reconnaissance.

In all, eight detachments of two machines each were used last season and the aggregate flying time totalled more than 3,400 hours. Activities extended from Nova Scotia on the east to British Columbia on the west, and included work in every province.

A total of about 70,000 square miles was covered by aerial photographs of which 24,000 square miles were vertical and 46,000 square miles oblique photography. Vertical photography is used by the Topographical Survey to map rough country or where great detail is required, while the oblique photography has a field of its own in mapping and exploring the great hinterland.

Canada has for years led the world in aerial surveying and during the past season has consolidated that leadership by applying for the first time in any country aerial methods to geodetic reconnaissance and transportation. This has been done with a very marked saving both in time and money, particularly as the work has been largely done by aeroplanes on photographic operations in weather which was unsuitable for photography and when otherwise the aircraft would have been idle. In all more than 300 hours were flown for the Geodetic Survey of Canada, giving an increase of about ten per cent. in the utilisation of the photographic machines at no expense for equipment or personnel. This increase, however, tells only part of the story, as two-thirds of the geodetic work was done by one detachment only in its spare time. It is reasonable to assume that with the benefit of a season's experience in aerial work the Geodetic Survey will be able to make use of the aeroplane even more extensively in the future.

The operations of 1929 showed that the geodetic reconnaissance, both general and detailed, can be made by aeroplane. An area can be covered in a few hours that would take weeks or months of arduous travel afoot. After the stations have been selected, the tower-building party can be transported by air and landed on some lake near the station. After the work is completed the party is moved to the next station by aeroplane which brings in, on its trip, fresh supplies and materials. The observing party sets out its lights by aeroplane and is moved from station to station in the same way. In addition to all this the chief of the party and the Head Office in Ottawa are thus able to keep in almost daily touch with the various widely scattered units of the organisation.

During the season the aeroplane was also largely used by the Supervisory Mining Engineer and members of his staff to keep in touch with developments and prospecting throughout the Prairie Provinces and the Northwest Territories. Those engaged in mining activity in many parts of Canada are placing more and more reliance in aerial prospecting and transportation.

BRISTOL BULLDOGS ABROAD.

Some months ago the Latvian Government took delivery of five Bristol Bulldog single-seat all-metal fighter biplanes (Bristol Jupiter VI engines). Since their arrival in Riga these machines have given so much satisfaction that the Latvian Government has now placed a further order for seven more Bulldogs. Five of these will be fitted with direct-drive Jupiter engines and two with supercharged Jupiter engines.

The Estonian Government before deciding to adopt a new type of fighter aircraft has watched with the closest interest the results obtained in the neighbouring State of Latvia with the Bristol Bulldog. In spite of the keenest competition from other quarters the results shown were so convincing that the Estonian Government has now placed an order for twelve Bristol Bulldogs with the Bristol Aeroplane Co. Ltd.

TWO POINTS OF VIEW.—Two photographs taken from the back seat of a Hawker Hart. On the left another Hart piloted by Mr. Sayre, and on the right Mr. P. W. S. Bulman, the chief pilot of the H. G. Hawker Engineering Co. Ltd.—(*"Aeroplane" photographs.*)

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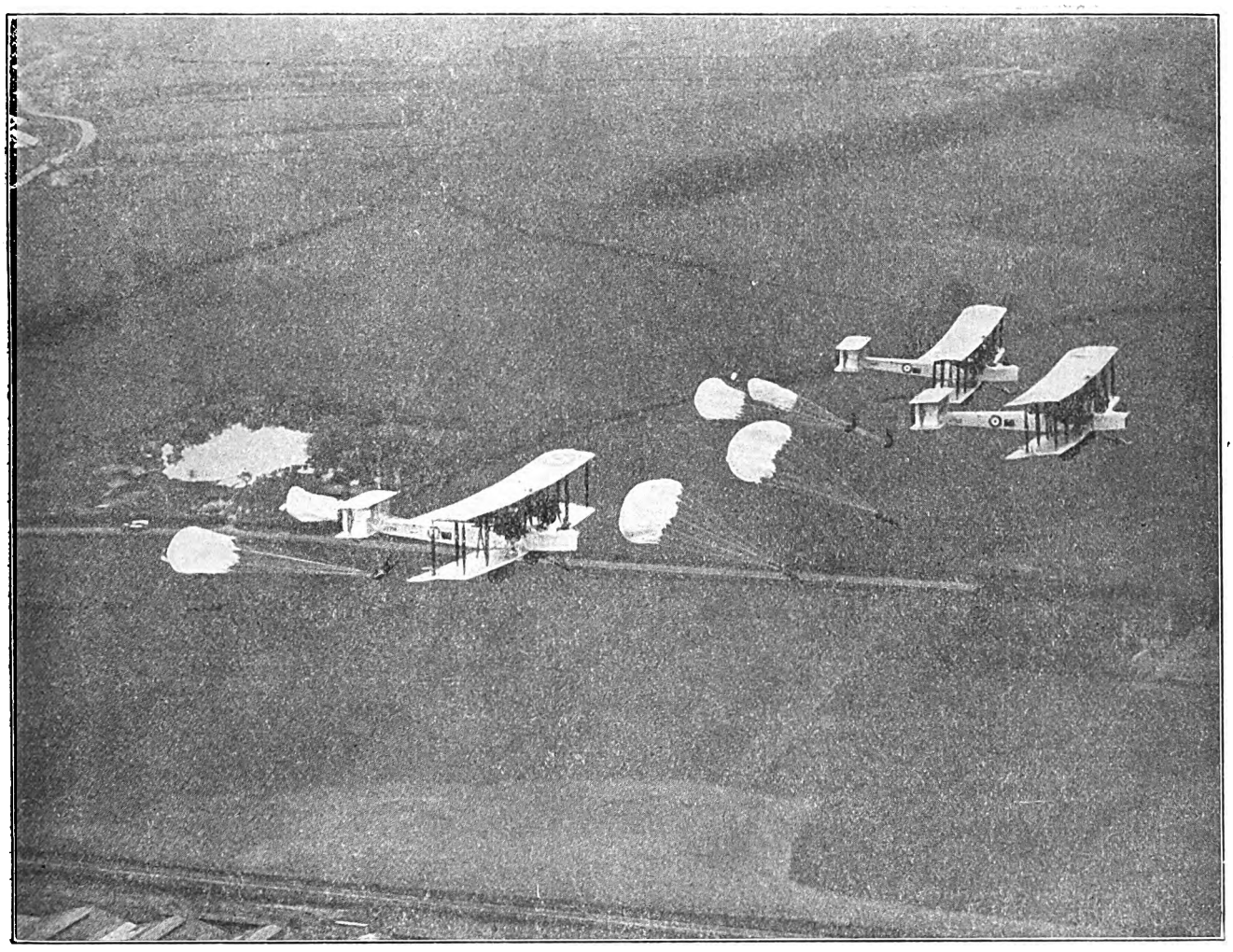

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WATER-COOLED AERO ENGINES.

On Feb. 27 Mr. A. J. Rowledge read a paper on "Six Years' Progress of Water-Cooled Aero Engines" before a joint meeting of the Institution of Automobile Engineers and the Royal Aeronautical Society at 18, John Street, W.C.2. There was a very crowded attendance and the big lecture hall was completely filled. A number of people had to stand but there was much keenness to hear what Mr. Rowledge would have to say about the engine built by his firm which won the Schneider Trophy Contest, and now holds the World's speed record.

Colonel The Master of Sempill, introducing Mr. Rowledge, said that he had been with the Wolseley Company at the outbreak of the War 1914-18 and that he tried to get taken on for aero-engine design, but was told that the War would be soon over and that he should not disturb himself. He joined the Napier Company, however, a little later, and had much to do with the design of the Raf.3 engine. Mr. Rowledge next designed the Napier Lion and was with that firm until 1921, when he joined the Aero Engine Dept. of Rolls-Royce, Ltd. He is now principal assistant to Mr. Royce.

Before starting to read his paper Mr. Rowledge explained that he had been given the choice of aero-engines for his paper, but that he had chosen water-cooled as his experience had been limited to that type. He explained that he chose the subject of the paper to enable him to include information which had been acquired in six years' intensive development.

Reliability is the first and most important quality for an aero-engine, and yet no quality is more difficult to achieve in face of the desire to give performance. This applies especially to engines intended for civil uses which Rolls-Royce, Ltd., hope will soon be their main source of demand. He said he supposed that machines for military purposes must excel in performance and that reliability could be obtained by frequent overhauls.

Reliability limits the working stresses though these can be higher with safety in an engine designed for the Schneider Trophy than in one designed for use in an airliner. Length of life also requires lower bearing pressures, which mean greater bearing areas.

An important feature for securing reliability is the ability to carry an overload, especially in a multi-engined machine. The better temperature control which is given by water-cooling is an advantage in this respect.

Discussing the question of first cost Mr. Rowledge said that the cost of useful horse-power is what really matters and a comparison between water and air-cooled engines is not easy to make. He quoted the overnight changing of the cylinder block of the Schneider Trophy engine to prove that cost of overhaul of the water-cooled engine need not be high. The water-cooled engine has a better fuel and oil consumption than its rival.

The Rolls-Royce "R" engine, which holds the Record of 357.7 m.p.h., has a horse-power of 1900 for a weight of 1,530 lbs., or .805 lbs. per h.p., or for maximum horse-power attained on the test bed .75 lbs. per h.p. He said his firm believed that these figures could be improved when there was an opportunity for a little more development work. The standard Rolls-Royce "H" engine is rated at 825 h.p. and yet has the same capacity as the racing engine which shows the necessity for experienced judgment in deciding between reliability and performance.

Mr. Rowledge seemed to think that development will be in the direction of relative reduction of cylinder capacity on a given crank, but with high Mean Effective Pressures and a high rate of crankshaft revolution.

A normal type of engine without supercharger has a B.M.E.P. of 133 lbs., and an engine which has a moderate degree of ground-boost has a B.M.E.P. of 143 lbs at its rated h.p. The latter is a "gated" engine, and compares in use with a high-compression engine protected by a gate against over-load on the ground. The weight of these engines per b.h.p. at ground level is 1.76 lbs. and 1.71 lbs. per b.h.p. respectively, or 1.6 and 1.56 at maximum power. These are geared engines complete with all accessories.

One type of supercharged engine has a B.M.E.P. of 130 lbs. at 11,500 feet with a weight per b.h.p. at that altitude of 1.88 lbs. compared with a B.M.E.P. of 90 lbs. and 2.62 lbs. per b.h.p. of a normal engine under the same conditions. The normal engine has 37.8 b.h.p. per 100 cub. in., the moderate-supercharged engine 40.5 b.h.p., and the racing engine at maximum power has nearly 90 b.h.p. per 100 cub. in.

Mr. Rowledge agreed that speed competitions combined with attempts to break the non-stop distance record are very big aids towards developing the performance features of engines for civil aviation.

In the six years that have elapsed since Mr. Rowledge read his previous paper on "Water-cooled Aero-Engines" before the Institution of Automobile Engineers two views expressed in that paper have been vindicated. These are the use of reduction-gearing for air-cooled engines and the practical application of the gear-driven supercharger. Mr. Rowledge would like more attention paid to the three-bladed airscrew and pressed for a reduction in the weight and inertia of the metal types of airscrew.

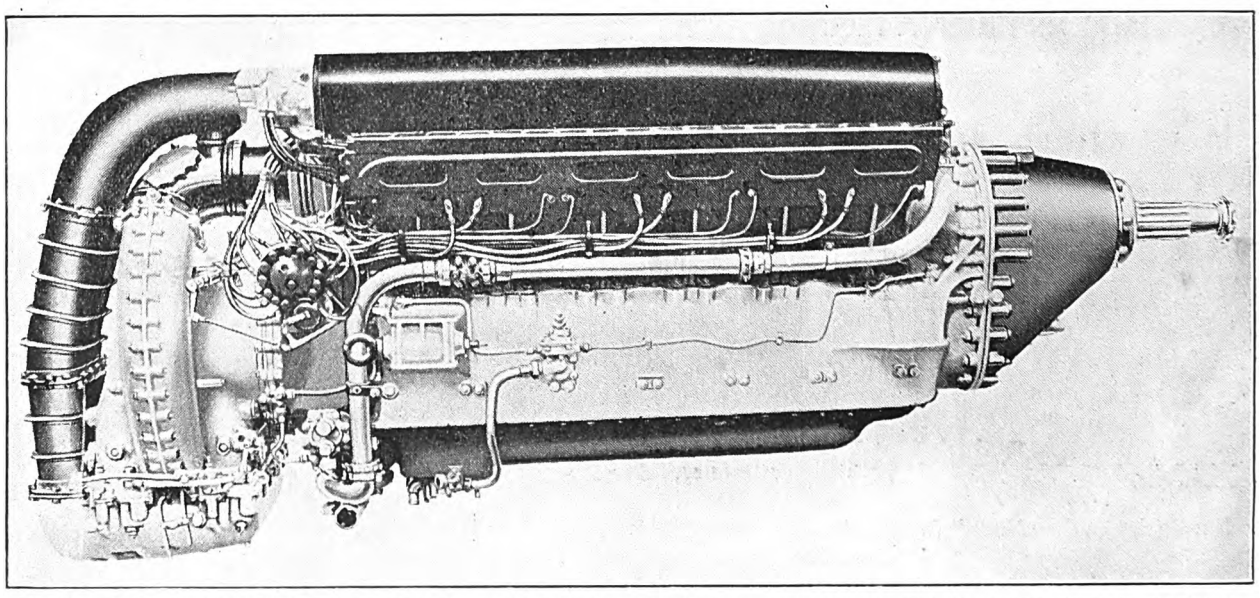
The radial engine generally uses an epicyclic form of gear to keep the same centre-line for crankshaft and airscrew. This ensures a uniform air-flow over the cylinders. Vee engines generally use spur gearing. The success of these gears is due very largely to the accurate grinding of the teeth. The case-hardened steel used has a core strength of 85 tons per square in. and a reduction of area of 40 per cent. The surface hardness is at least 57 Rockwell. In standard engines, pressures per inch of tooth face are as high as 3,400 lbs. and the pitch-line velocity is 3,200 ft. per minute.

According to Mr. Rowledge, the next few years should see the general adoption of evaporative or steam-cooling with the condensers built into the wing or fuselage. A public demonstration of this system has been given by the airship R 101. He referred to the use of ethylene glycol in place of water as the cooling medium and compared it with the evaporative system.

Mr. Rowledge said that at some future date automatic mixture-strength regulation with change of altitude would be universal.

He said that the variable-pitch airscrew had made some progress but is still in the experimental stage. Such an airscrew tends to keep up maximum torque and keep down engine revolutions when cruising. Most engine builders dislike this combination. An airscrew of this kind should reduce fuel consumption.

Mr. Rowledge suggested that if a wide enough range could be obtained between the cruising r.p.m. of an engine and its



THE RECORD BEATER.—The 1,900 h.p. Rolls-Royce "R" engine which won the Schneider Trophy and put up the World's Speed Record to 357.7 m.p.h.

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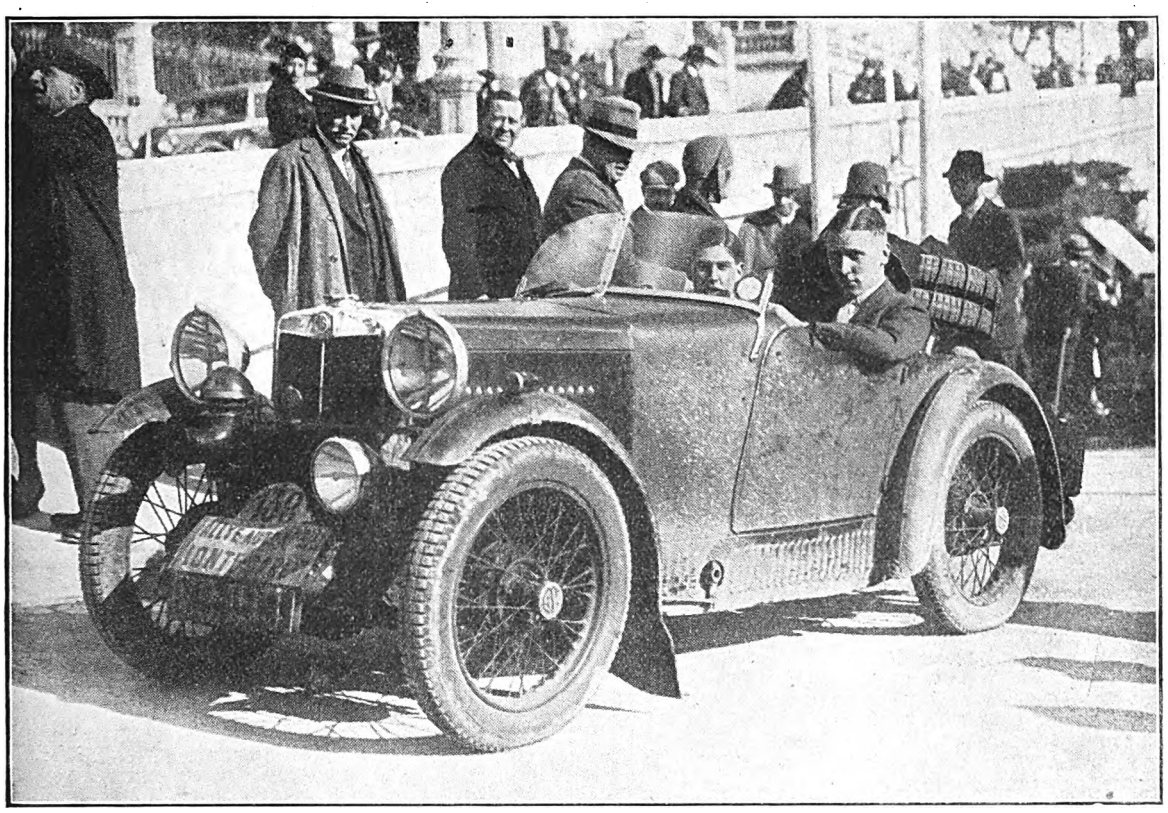
The M.G. Midget Beats the Big Fellows!



In the 1930 Monte Carlo Rally an M.G. Midget two-seater, privately entered by the owner himself, Mr. F. M. Montgomery, unassisted in any way by the Factory, not only made a no-trouble run to Monte Carlo, arriving at all controls ahead of schedule time, but distinguished itself otherwise. Competing in the Mont des Mules Hill Climb, open only to Rally Competitors, not only did Mr. Montgomery win his Class (750 to 1,100 c.c.) with an 847 c.c. engine in record time, but he was actually faster than the winners of the 1,500 c.c., 2,000 c.c and 5,000 c.c classes, representing the pick of the world's cars.

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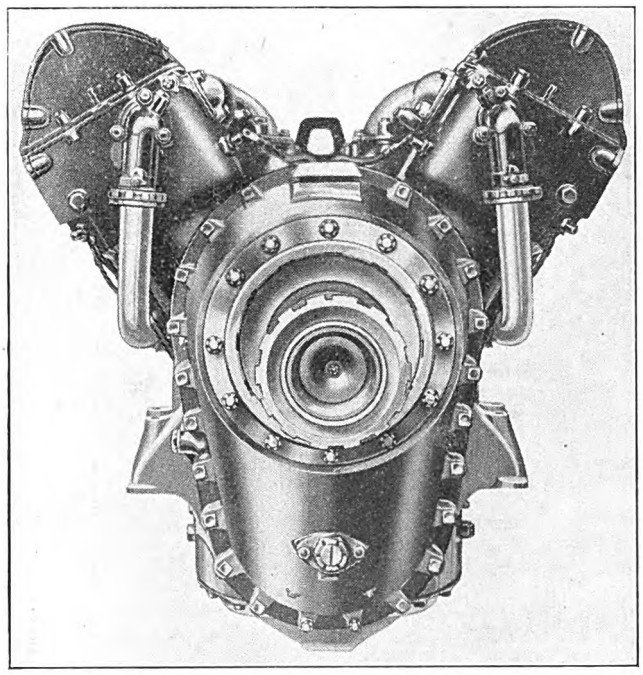


FRONTAL AREA.—The nose end of the Rolls-Royce "R" engine. In the Vee will be seen the mouth of the air intake.

maximum permissible speed the variable-pitch airscrew would lose most of its advantages and not be worth fitting.

Mr. Rowledge thinks the most important development of recent years is the use of the geared centrifugal-blower for supercharging, either for restoring ground-power at height or for ground-boosting. The rotors of these blowers have been run up to 32,500 r.p.m. and on the 11,500 ft. supercharged engines their speed at the maximum permissible speed of the engine is 27,000 r.p.m.

In this country the carburettor is placed on the suction side of the blower. This keeps the float chamber low down on the engine, helps gravity feed and the fuel does not have to be fed against boost pressure. The displacement type of blower promises to prove useful, but though in general use on racing cars has not yet been standardised on any aero-engine The exhaust-driven type seems likely to fall right out of use.

Another form of supercharging has been developed by Rolls-Royce Ltd. in which advantage is taken of the aeroplane's speed being usually more than the air velocity in the normal type of intake. The mouth of this intake is arranged to take in a slice of air without spilling. The velocity of this air is reduced in an expanding pipe and converted into pressure energy. This is the cheapest and lightest method of increasing the power of an engine yet found. On the Continent the carburettor is more generally placed after the blower.

Mr. Rowledge bemoaned the fact that a B.M.E.P. of about 130 lbs. has to be used for commercial work because the supply of non-detonating fuel cannot yet be depended on. He hopes the fuel suppliers will continue their efforts as a cheap and plentiful supply of a satisfactory non-detonating fuel will do a very great deal to increase the efficiency and reliability of aero-engines.

The design of combustion space is badly hampered by the need to include sufficient valve area. The small total volume of the clearance chamber also makes the designing of the combustion-space in anti-detonating form more difficult. The Air Ministry now allow a certain amount of detonation with standard fuel if the engine can stand up to a 20-hour run, in addition to the standard type-test. During the former test the engine speed is pulled down to ground-running conditions and is developing full power at that speed.

Mr. Rowledge said that the least progress has been made towards engine-silence. The best result to date was probably that of the old six-in-line water-cooled engine with direct drive and long exhaust pipe.

The Rolls-Royce "R" Engine.

Mr. Rowledge then gave some particulars of the Rolls-Royce "R" engine, and these are the first that have been released for publication.

The bore and the stroke of the "R" engine are the same as the standard "H" type, that is, 6 and 6½ in. respectively. Every other part of the engine, however, is different. The blower is of increased capacity for the bigger boost and the outline was altered to suit the nose of the racing machine. The covers of the airscrew reduction-gear were streamlined for this purpose as were also the camshaft covers. The air inlet is in the Vee of the cylinders and is of the expanding type already described.

During the final tests of the "R" engine a 300 m.p.h. wind was blown over the air intake, to reproduce actual running conditions. The wind was made by a blower driven by an "F" engine and a second "F" driving a pusher airscrew supplied the cooling air and removed the exhaust gases

Mr. Rowledge said that the success of the engine in the race would have been impossible without the close contact that existed between Mr. Mitchell, the designer of the Supermarine S-6, and the Rolls-Royce Company. Such co-operation is much easier when one special engine is being built and there is still room for more collaboration between the engine and aircraft firms as well as with the people who draw up specifications for aircraft.

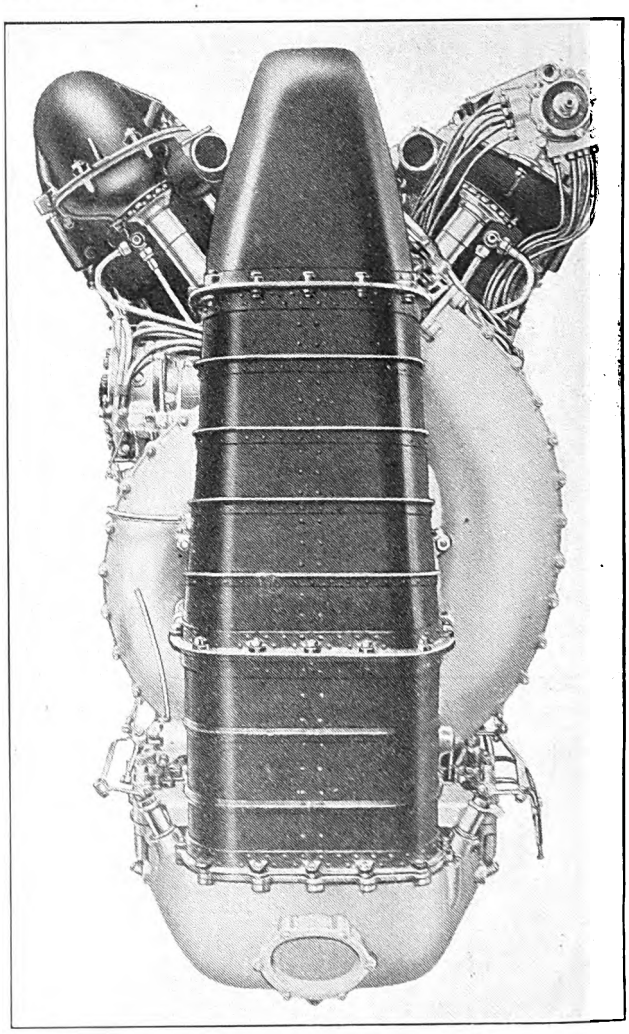
The "R" engine was also a full-scale test of ground-boosting and showed that a considerable ground-boost can be used satisfactorily.

Engine-driven fuel-pumps are now accepted accessories and the two main types are the gear and the diaphragm types. The latter can be arranged not to pump beyond the desired pressure and the former requires a separate relief valve. The gear-type which uses lubricating oil to lubricate the spindles and seal the gland can be run without pumping petrol and makes a reliable unit.

The weight of the latest magnetos has been reduced by the use of cobalt chrome magnets.

After saying that there had been a steady improvement in materials, Mr. Rowledge described a method of fatigue-testing which they had developed. A cylindrical casting with a conical base was bolted to a face-plate and revolved with a weight applied to an extension on the free end. The Rolls-Royce Company are using a new alloy known as R.R.T.50.L. which, in the cast form, has an ultimate strength of not less than 12 tons with an elongation of 3 to 8 per cent.

The same material sand-cast and heat-treated at a low temperature has an ultimate strength of 14 tons and elongation of not less than 3 per cent. The specific gravity does not exceed 2.75. This material retains its strength particularly well at high temperatures and has a consistency of quality under ageing conditions not possessed by zinc alloys.



SUPERCHARGING.—The rear end of the Rolls-Royce "R" engine showing the expanding air intake to the supercharger.

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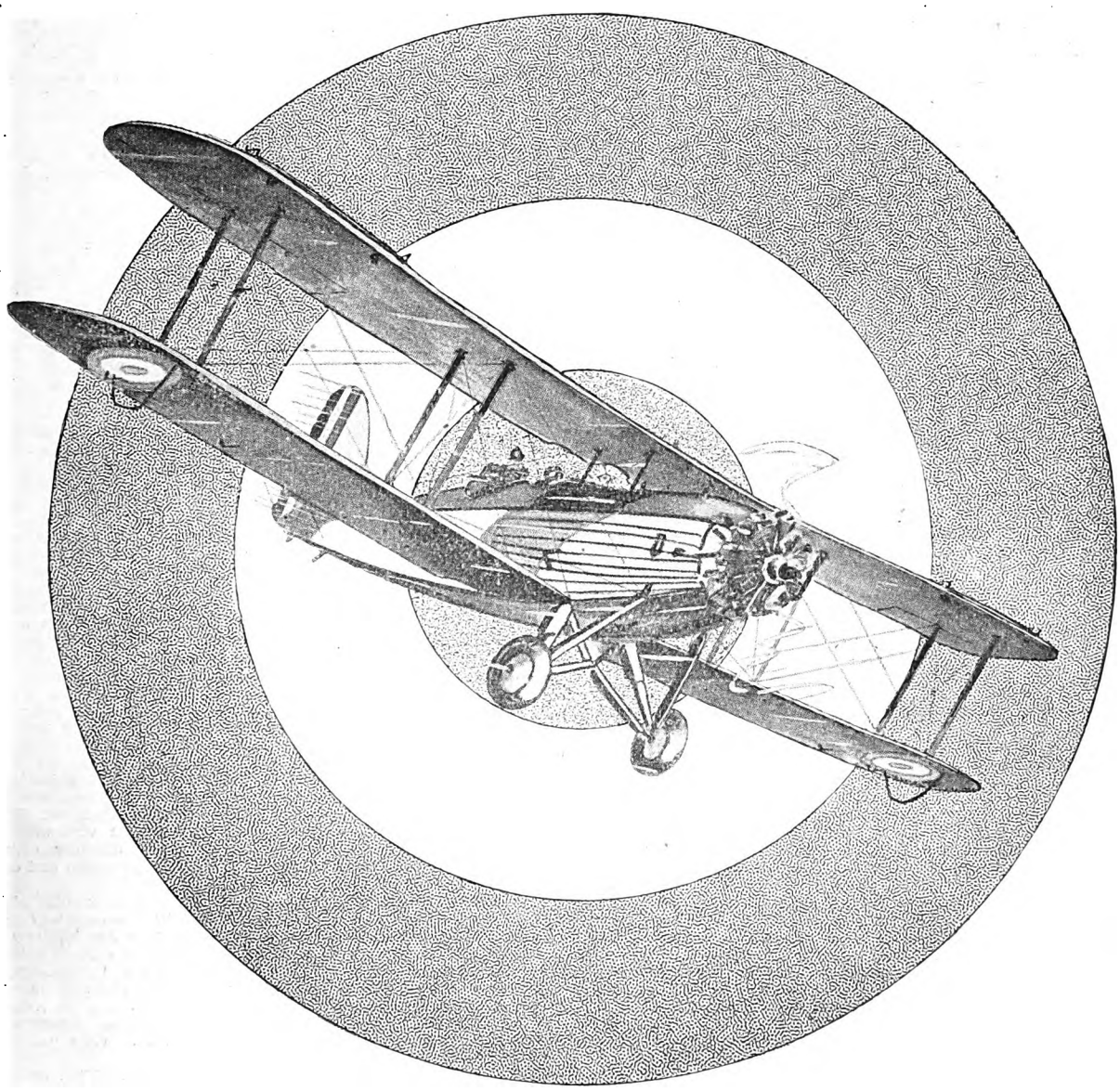
THE WESTLAND WAPITI



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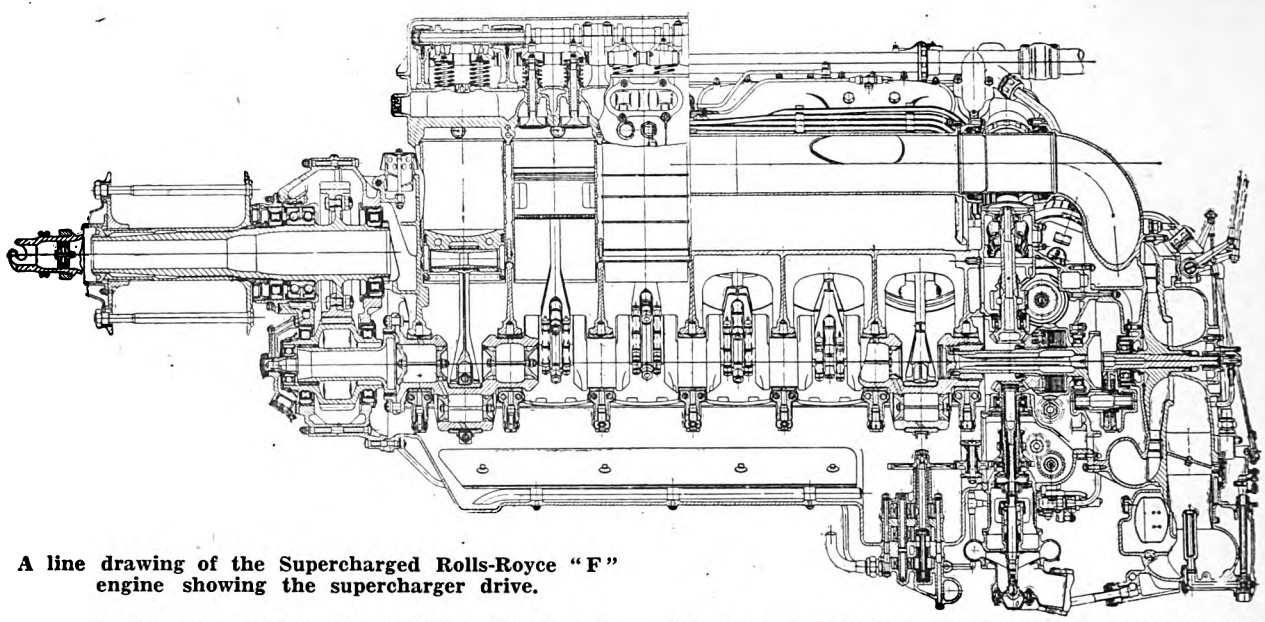

A line drawing of the Supercharged Rolls-Royce "F" engine showing the supercharger drive.

This material has very good forging qualities. Besides aluminium the constituents are copper, silicon, nickel, titanium and others.

An increased number of valve steels are available for special purposes, one of which is a steel with a high proportion of chromium, nickel, and silicon. This material retains its strength at high temperatures, though it is soft for the stem. Loose hardened-tips have to be used to take the wear of the valve tappets.

Nitrogen-hardening steels are being vigorously developed, particularly for cylinder-liners and crankshafts. If the early promises come true this material will greatly improve the life of some of the wearing parts of an engine

THE DISCUSSION.

COLONEL SEMPILL, after referring to the development of the "R" engine in record time, said he was glad to see that the Rolls-Royce Company recognised the value of record attempts in the development of engines for commercial types, a type which the firm hope to supply largely in the future. He called on Mr. Tookey of the Institution of Automobile Engineers.

MR. W. A. TOOKEY explained that he was only on the platform to represent the Automobile Engineers. His work was not of the kind that could be expressed in fractions of a pound, nor was the automobile engineer ever allowed to make the noises permitted to the aero engineer.

MAJOR BULMAN, Assistant Director (Engines) in the Department of Supply and Research at the Air Ministry, said that a notable feature of the lecture was the releasing of authentic details of the "R" engine. We could not expect these large horse-powers to be available for immediate use, though they might be available for service use in two years. He thought that reliability was very important for service use. A visitor from Mars might be struck with the roughness of our engines and their tendency to freeze-up. He said that from the Air Ministry's point of view the question of choosing an engine for the race was mainly one of personality. They gave the job to the people whom they thought could do it and let them get on with it.

MR. CHORLTON said that the use of supercharging was the most important development in the period reviewed by this paper and drew attention to the length of time which had elapsed since Dugald Clark's first supercharging patent in 1902 and the actual application of the device. He drew attention to the trouble that had been, and was likely to be, experienced with torsional vibration and asked for the author's experience of this feature.

Would not the development of a glass-hard material make for greater use of high-speed machinery because of the increased life such material would give to moving parts. He had heard that the successful use of ethylene glycol necessitated the redesign of the engine as more fluid had to pass any given spot.

MAJOR F. M. GREEN, of Sir W. G. Armstrong Whitworth Aircraft Ltd., said that the air and water-cooled engines owed much to each other. He drew attention to the fact that the R.A.F. had used supercharged air-cooled engines designed by his firm for the last four years. Referring to Mr. Rowledge's remarks about variable pitch airscrews, he said that the variation from correct pitch for the various angular conditions was so slight as not to matter.

He pointed out that the evaporative cooling system did not supply a constant temperature because of the alteration of boiling point with altitude which was appreciable at 20,000 feet. He recalled how early in the War 1914/18 he had to see Mr. Royce and suggest that in the interests of production his engines should be made more simply and with fewer parts. He asked him to give up the epicyclic gears and adopt the spur type. He was unsuccessful in these requests. But now the Rolls-Royce engine used the spur-gear type of reduction and the Jaguar made by his firm used the epicyclic gear.

MAJOR BARLOW, of the Fairey Aviation Co. Ltd., drew attention to the importance for good fuel consumption. For flights of over 400 miles, 65 per cent. of the disposable load was fuel. He said that if the weight of airscrews was to be reduced, the engine and the airscrew designer must both combine against the metallurgist. The airscrew designer had a big difficulty in designing an airscrew with the same diameter for increased power.

Referring to reduction-gears, he said that their lubrication ought to be separated from that of the engine, as the same lubricant could not be ideal for both. He put the onus for lack of co-operation on the engine people and recounted difficulties that had been experienced in working for months to an installation drawing only to find when the engine arrived that it was quite different. He referred to the importance of inertia starters either electrically or manually operated and the importance of direct injection of lubricants to moving parts to make starting from cold easier.

WING COMMANDER HYNES, who is Chief Inspector (Engines) in the A.I.D., said that a retrospective paper of this kind was valuable as through its aid one could see the wood as a whole instead of the individual trees. One could see the progress which had been made and the opportunities which had been missed. One of such opportunities was the use of evaporative cooling. Such a system enabled one to reduce the weight of the total power-plant per B.H.P. as opposed to the weight of the bare engine. He was not yet convinced that the exhaust-driven supercharger was a back number. It might be for the petrol, but not for the compression-ignition engine.

MR. PYE, Deputy Director of Scientific Research at the Air Ministry, said he was sorry the paper said nothing about future developments except to refer to the likelihood of capacities being less, and M.E.P.s and crankshaft speeds being higher. He said that Mr. Rowledge recounted none of his own troubles. He felt sure that with speeds increased to 3,000 r.p.m. there must have been difficulty with bearings, and with the increased M.E.P., in keeping the piston and exhaust-valves cool.

As his job was to see a way out of possible future difficulties he thought that the single sleeve valve might be the only way to avoid difficulties with overheated exhaust valves. The Air Ministry therefore asked Mr. Ricardo to make some tests. Two engines were made, one with a bore of 2 7/8 in. and stroke of 3 1/2 in., the other with a bore of 4 1/2 in. and 5 1/2 in. stroke. The smaller one was used at very high speeds and the larger one with a high degree of supercharging. The smaller one ran for 100 hours at 5,000 to 6,600 r.p.m. and developed 175 h.p. per 100 cub. in. (The "R" engine developed 90 h.p. per 100 cub. in.)

The larger engine ran at 1,500 r.p.m. with an M.E.P. of 400 lbs., and an induction pressure of four atmospheres. He explained that better results are always obtained with test-cylinders than with a whole engine, but results of this kind could not be discarded. Maximum horse-power must be available for take-off and that was why a variable-pitch airscrew would be a good thing.

MR. BRAMSON asked whether a solid injection type of engine was inherently heavier than the normal four-stroke type.

MR. L. F. HOWARD FLANDERS pointed out that Levavasseur used evaporative cooling on the Antoinnette monoplane twenty-six years ago. The weight of the system was ten pounds and cooled 100 h.p. Forced induction was used on cars at Brooklands in 1906.

COLONEL SEMPILL asked whether a compound system of cooling could be used, ethylene glycol for the heads and air cooling for the barrels. He said that the United States Navy were turning from air-cooled engines to those using ethylene glycol. He asked for Mr. Rowledge's experience of torsional resonance and whether a form of spring hub would be any good.

MR. ROWLEDGE, in his reply, thanked everybody for their kind expressions and said he had always been fortunate in finding happy situations. No man does much by himself. A designer's job is to produce the best design and not original work. He said that few people realised how much work Mr. Royce did himself.

Replying to Major Bulman, he said that rough running and freezing would get better and that freezing would go altogether. One kept as clear as possible of vibration in the main design and then put in dampers where necessary. Ethylene glycol could be adopted to a good cylinder design. One forgot troubles when everything was over. He was always thinking that the limiting temperature the poppet valve would stand had been reached and always a new way of overcoming this difficulty was found.

Referring to the early use of forced induction, he said that the trumpet was generally placed the wrong way with the large area as inlet. In time with suitable dopes the consumption of the petrol engine would equal that of the compression-ignition engine, the heavier weight of which was due to its low M.E.P.

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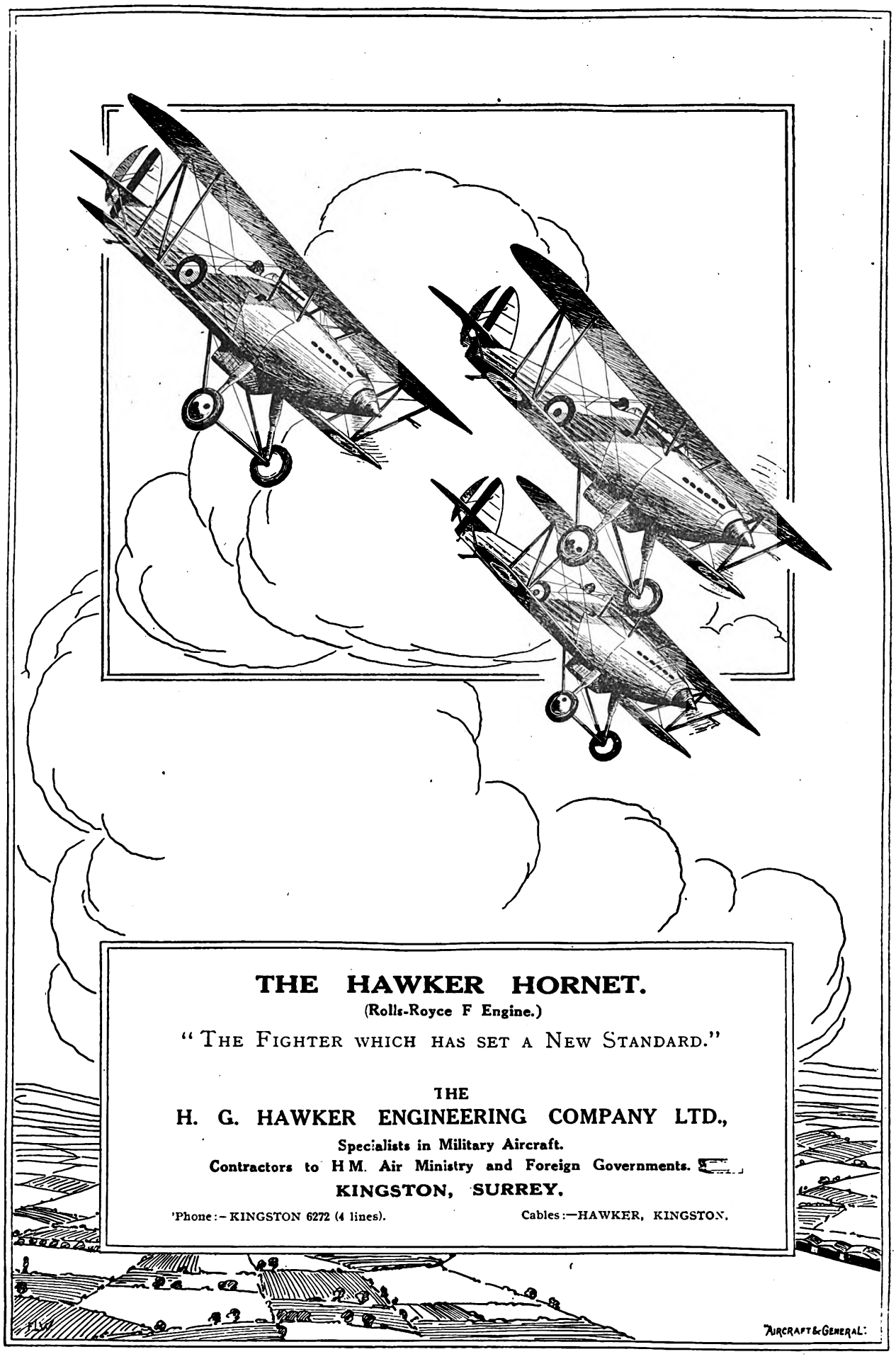

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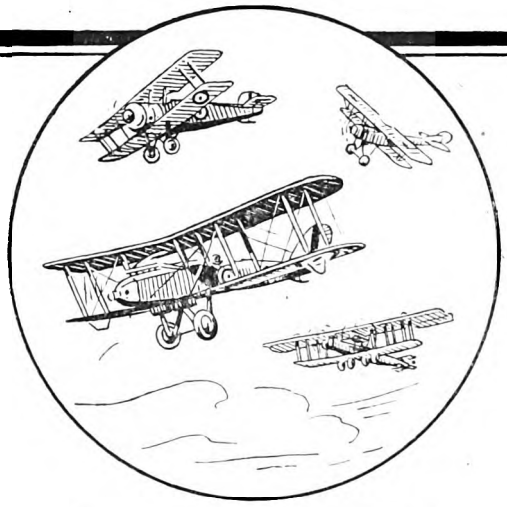

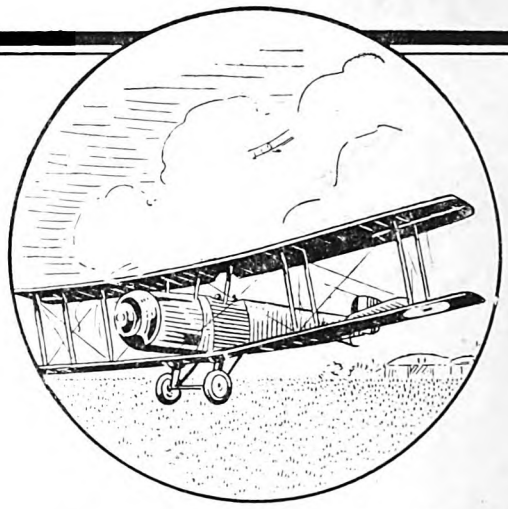

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,,	195	130·	38·09	Central
300 × 60	16	111·12	25·4	Central
450 × 60	30	89·	31·75	Central
,,	172	130·	38·09	Central
575 × 60	21	160·	28·	Central
,,	180	150·	38·09	104/46
,,	186	120·	34·92	Central
,,	190	150·	38·09	Central
600 × 75	21	160·	28·	Central
,,	180	150·	38·09	104/46
,,	186	120·	34·92	Central
,,	190	150·	38·09	Central
700 × 75	78	178·	44·45	132/46
,,	79	178·	44·45	Central
,,	100	178·	38·09	132/46
,,	101	178·	31·75	132/46
	196	178·	55·	Central
600 × 100	188	120·	34·92	Central
,,	304	150	38·09	104/46
,,	333	120·	34·92	Central
700 × 100	77	178	44·45	132/46
,,	92	185·	55·	135/50
,,	95	185·	55·	Central
,,	99	178·	38·89	132/46
,,	112	150·	38·09	Central

Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
700 × 100	176	178·	44·45	Central
,,	179	178·	55·	132/46
650 × 125	119	178·	55·	132/46
,,	147	178·	55·	Central
,,	188	120·	34·92	Central
,,	336	178·	44·45	132/46
750 × 125	77	178·	44·45	132/46
,,	92	185·	55·	135/50
,,	95	185·	55·	Central
,,	99	178·	38·89	132/46
,,	112	150·	38·09	Central
,,	176	178·	44·45	Central
,,	179	178·	55·	132/46
800 × 150	161*	185·	55·	135/50
,,	162*	185·	55·	Central
,,	163*	185·	66·67	135/50
,,	169†	185·	55·	135/50
,,	177	185·	55·	135/50
,,	183	185·	55·	Central
,,	211*	185·	60·32	135/50
1000 × 150	167	185·	55·	125/60
,,	174	250·	80·	Central
,,	182	185·	55·	Central
,,	187	220·	66·67	Central
,,	201	185·	60·32	125/60
,,	210	185·	60·32	Central

Tyre Size	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
1000 × 180	148	220·	80·	Central
,,	149	185·	55·	Central
,,	155	220·	66·67	Central
,,	166	185·	55·	125/60
900 × 200	107	185·	55·	Central
,,	108	185·	55·	125/60
,,	128	220·	66·67	Central
,,	137	250·	80·	Central
,,	157	185·	80·	Central
,,	202	185·	60·32	Central
1100 × 220	134	220·	66·67	Central
,,	136	250·	80·	Central
975 × 225	192	185·	60·32	Central
,,	194	185·	55·	125/60
1100 × 250	364	220·	60·32	Central
1250 × 250	314	250·	80·	Central
,,	154	304·8	101·6	Central
1500 × 300	305	304·8	152·4	Central
,,	306	304·8	101·6	Central
1525 × 325	197	304·8	101·6	Central
1750 × 300	139	400·	152·4	Central
,,	191	350·	150·3	Central
1750 × 350	193	400·	125·	Central
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THE LIGHT AEROPLANE
AND THE FLYING CLUBS.

A SOUTH AFRICAN TOUR.

Mr. J. Williamson, of Cape Town, is the owner of a Boulton and Paul P.9 two-seat biplane (90 h.p. Raf air-cooled engine) and in spite of its age this machine gives its owner excellent service as a touring aeroplane of the moderately light class.

The P.9 was produced soon after the war 1914-18 and as at that time private flying was almost completely unknown, very few machines of this type were built. The Boulton and Paul company used one as a tender for its Sales Department and various examples found their way overseas, notably to Australia, Tasmania, and South Africa. Even to-day, news is still being received of the continued existence of the P.9, and the following account of a 3,000-mile holiday tour made last year by Mr. and Mrs. Williamson is interesting because this machine is believed to be the last survivor of this interesting type which was produced something like ten years before its time.

Mr. and Mrs. Williamson left Wynberg aerodrome, Cape Town, on July 21, and flew through mist and without a compass to Oudtshoorn. The next morning after wiping ice off the machine they flew to Port Elizabeth. The total flying time between Cape Town and Port Elizabeth, 420 miles, was 4 hours 20 minutes. The next day they proceeded to East London, and after a three-day stay continued to Durban in a gale. The journey between East London and Durban was completed in the excellent time of 2 hrs. 55 mins. for the 320 miles.

Three days later they left Durban for Dundee, but shortly after starting ran into heavy fog over mountainous country. After 30 minutes they came out of the fog completely lost and landed on a polo ground off the main street of a place called Greytown which was directly on their course. The polo ground was too small for a take-off during the heat of the day as it was only 200 yards square. In addition there was a 3-foot bank all round and its location was 3,500 ft. above sea level.

Next morning the engine was found to be down in r.p.m. and as the timing-gear case was very warm the machine was towed up the main street to a garage for examination. Here the engine was taken down, when it was found that the crankshaft was broken in No. 1 web. Mr. Williamson immediately cabled to Cape Town for a spare engine. This arrived by passenger train four days later, and inside the week he had built an engine out of the parts of the two.

After several test flights from the polo ground to ensure that everything was O.K., Mr. and Mrs. Williamson again left for Dundee. As Greytown was ringed with 7,000-ft. mountains with but one way out up a valley, a safe detour was made by way of Ladysmith, but fifteen minutes after leaving Greytown and at 8,000 ft. the engine began to vibrate and misfire.

Mr. Williamson flew on to Weenen, but found that the only possible landing ground there was a cotton field with the cotton in full bloom. He landed down the rows of cotton trees, and when the machine pulled up it looked like a Christmas tree with cotton-wool adhering everywhere, and the airscrew was choked with it. Here the engine was inspected. It started easily and gave full r.p.m. on the ground, but in the air it vibrated like a scalp-massage machine. As it was essential to get on to Dundee, Mr. Williamson took off, and hugging all possible forced-landing grounds, reached Ladysmith, where a landing was made in a mealie patch for lunch. Later in the day he flew to Dundee with the engine still vibrating and missing.

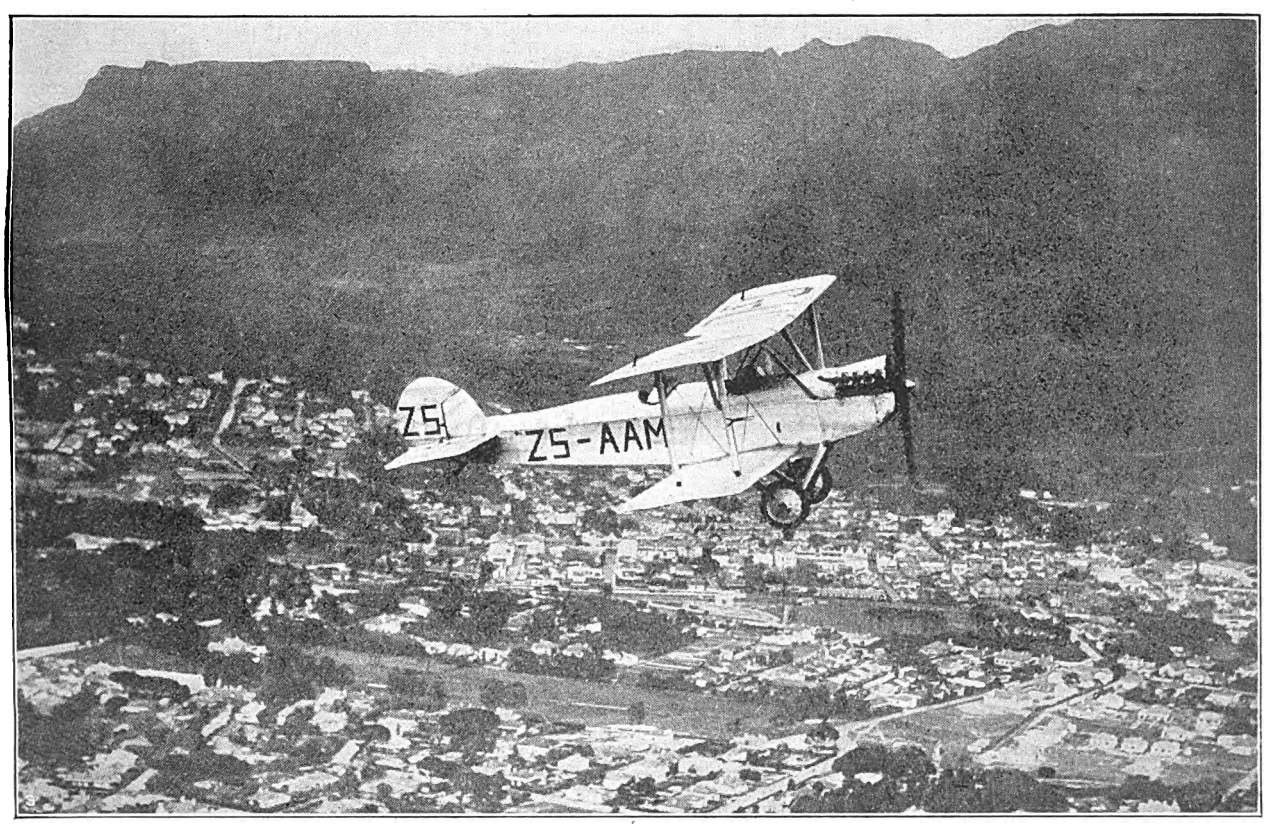
At Dundee the engine was given a complete inspection by Mr. Williamson with the aid of a local mechanic, and the cause of the trouble, a loose nut in the magneto, was put right.

From Dundee Mr. and Mrs. Williamson flew to Germiston, where they arrived in a gale with the air full of dust and the engine had to be kept running until two workmen could be found to hold down the wing-tips.

From Germiston they proceeded to Johannesburg, but they had difficulty in finding the aerodrome. Two landings were made *en route* to enquire the way, one of them in a racing paddock. Although this was very small and at an altitude of 6,000 ft. the P.9 got out easily.

From Johannesburg the machine was flown to Pretoria at the request of the Civil Air Board. The distance was covered in 25 minutes, and the P.9 arrived dead on the appointed time of arrival. It was met by Sir Pierre van Ryneveld, commanding officer of the S.A.A.F., Major Meintjes, Capt. Lindrup, the Secretary of the Civil Air Board, and many others. After the renewal of its Certificate of Airworthiness the P.9 left again for Johannesburg.

From Johannesburg Mr. and Mrs. Williamson left for Kroonstad, but 10 miles out No. 4 cylinder cut out. They managed to reach Vereeniging and landed near a road. Mr. Williamson stopped a motorist, borrowed a tool-kit, removed the defective cylinder and fitted a spare. He was



A SOUTH AFRICAN PRIVATE OWNER.—Mr. Williamson flying his Boulton and Paul P.9 over the outskirts of Cape Town.

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SOUTH AFRICAN TOURISTS.—Mr. and Mrs. Willia mson standing in front of their Boulton and Paul P.9 while on their 3,000 mile tour.

away again in half an hour, much to the amazement of the motorist. The Kroonstad aerodrome is four miles out of the town, and after circling the town Mr. Williamson had to wait an hour at the aerodrome until a small boy arrived on a bicycle

After filling up the journey was resumed to Bloemfontein in a gale and terrific heat. On landing at Bloemfontein Mrs. Williamson jumped out and grabbed a wing-tip and the machine was manœuvred under the lee of a hangar. Help did not arrive for 1½ hours, during which time it was necessary to hang on to the machine to keep it from being blown away.

From Bloemfontein, they proceeded to Middleburg, but owing to a head wind a landing was made at Trompsberg *en route*. They left again next morning in rain, but at Newpoort they found they could not get over the clouds or through a pass, so made a detour towards De Aar. By this time Mr. and Mrs. Williamson had been in the air for 2½ hours, and were stiff with cold, so they decided to land at the first likely spot. This proved to be a dried-up dam at Hanover Road. From here they proceeded to Richmond, where they landed on the veld with bush two feet high and in the presence of 2,000 people. Owing to the rough ground a short take-off was desired, so no petrol was taken on. Later they ran into rough, rainy weather, and were unable to see the mountains. As petrol was running short they again had to make an emergency landing, this time on a stony patch near a farm. There was no petrol available here, and the P.9 was marooned for two days by rainy weather. Eventually they were able to proceed to Biesjesfoort, where they landed on the veld and took in petrol. From here they flew to Beaufort West.

Next morning they left for Wynberg at 09.00 hours and flew down the main street to wave a farewell to their guests of the previous night. They ran into cloud and fog and had to go down to 20ft. to follow the railway line to Touws River, where they landed for petrol. Continuing they negotiated the dreaded Hex River Pass in spite of low clouds and reached Wynberg safely after a pleasant tour of roughly 3,000 miles.

The P.9 behaved very well. The only repairs required by the machine during the tour were a few fabric patches. It maintained a cruising speed throughout that compares very well with that of the present-day light aeroplane.

Mr. Williamson has modified his machine and engine slightly. The cockpit openings have been reduced and a large baggage compartment has been made in the cowling aft of the back cockpit.

He has two Raf engines, one of which was bought for £5 secondhand. In two years' flying, spares and repairs have not cost £25. A second magneto has been added to the engines, and this has increased the r.p.m. by 100. Careful tuning has reduced the oil consumption from 6 pints per hour, as quoted by the makers, to 3 pints per hour.

Mr. Williamson is now on the look-out for a modern engine to fit in his P.9, but it must be suitable and cheap. He is convinced that the P.9, so fitted, would be an excellent little machine capable to standing up to anything.

THE AERO CLUB OF EGYPT.

The Times reports the formation of the Aero Club of Egypt. The club will be affiliated to the F.A.I. and has been formed by leading Egyptians and foreign residents. The president is Prince Abbas Halim, the second cousin of King Fuad.

THE SECOND ASHWELL-COOKE CHALLENGE COMPETITION.

The entries for the Second Competition for the Ashwell-Cooke Challenge Cup, which was held on Sunday, Mar. 2, were disappointing. Three of the Club members who had expressed their intention of competing, were unable to do so. These were, Messrs. Milton, Scott-Taggart and Law. This left only Messrs. H. Calvert and R. Dallas Brett to compete, but at the last moment, the Ground Engineer, Mr. R. H. Wynne, must sportingly offered to enter in order to make up numbers. The weather was distinctly unpleasant with a strong gusty wind from the North.

Mr. Wynne, who had only about 3½ hours' solo to his credit, and who had never flown G-EBRI (which was used in the Competition) solo, had a couple of trial circuits with Mr. Brown, who passed him as fit. He then proceeded to make his two attempts in the Competition, scoring 51 marks out of 100 on his first attempt, and improving this to 75 marks on his second attempt. On both occasions he flew exceedingly well, and his 75 marks was good enough to win him the Cup. Mr. R. Dallas Brett had both his attempts disqualified for under-shooting by a small margin, and Mr. Calvert, who was placed second, was disqualified on one attempt for under-shooting, and on the other he over-shot badly and gained only 10 marks. Mr. Wynne's performance was extremely creditable and deserves heartiest congratulations as a very sporting effort.

The revised Rules provided a much more interesting Competition than last time, and made it considerably more difficult. We are again indebted to Flg. Off. Fox Barrett, R.A.F., for giving up his time to act as Judge.

It is exceedingly disappointing to the Club officials to find that these Competitions are so badly supported. They thought that private owners of aircraft in the South of England would welcome an opportunity of competing amongst themselves every month, and they were prepared to do their utmost to give Competitors a good time. The competition is interesting and a real test of skill. Lympne is under an hour's flight from any of the London aerodromes, where there must be dozens of private owners who have nothing to do on Sundays, and yet in the first two competitions, only one entry has been received from outside the organising Club.

If the Competition is not wanted, and if the more sporting private owners will not come forward and support it, the Committee will have to consider either extending the period and making the Competition a quarterly one, or withdrawing it altogether. Much will depend upon the support obtained at the next Competition, which will be held at 14.30 hours on Sunday, Apr. 6, and it is hoped that on that occasion to see competitors from Stag Lane, Brooklands, Heston and Hanworth, in open competition.

Copies of the Rules, Regulations and entry forms can be obtained from the Hon. Sec., 114, High Street, Hythe, Kent, on receipt of a postcard. The entrance fee is only 5s. and by courtesy of the Air Ministry competitors will be charged only one landing fee, i.e., half a crown, during their visit to Lympne. It would be appreciated if sportsmen intending to compete, would send in their entry forms at least a week before the date of competition.

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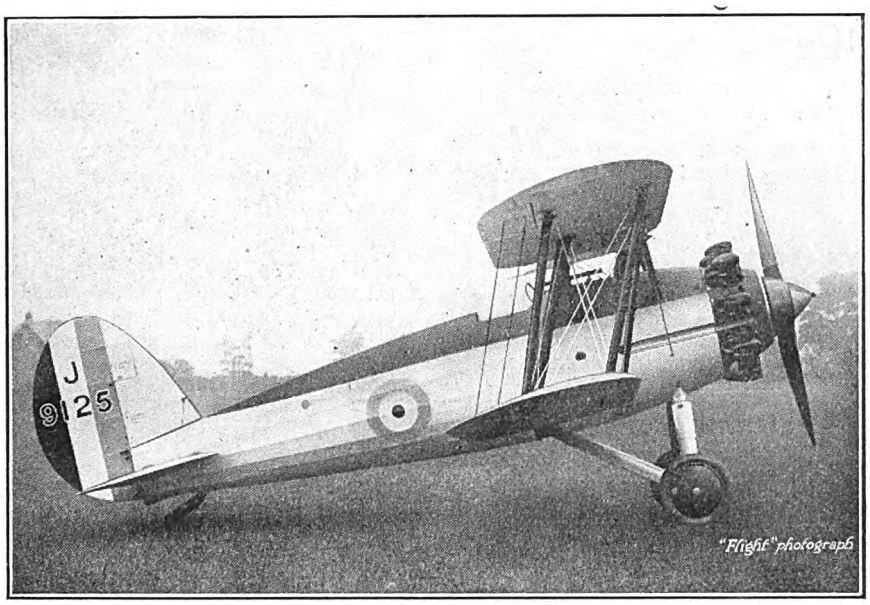

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company, a display by Mr. Bulman on a Hawker Hart, and aerobatics by Mr. R. R. Bentley of Shell Mex Ltd. on a Moth.

A diversion was caused by Mr. Jock Anderson suddenly leaping into a Moth, flying under the Byfleet Bridge, and then landing again, all inside three minutes. He said he suddenly saw the bridge and thought it was put there for that purpose.

During the day the company of the musical comedy "Silver Wings" visited the aerodrome, and many of them made flights. One of the company, Mr. Art Fowler, has long been a skilled pilot and owns a Moth.

The members of the company sat and stood round aeroplanes in various attitudes of Cleavage, Periwinkle, and Lympoon which, had it happened at Stag Lane, would have enabled the Rumble Club to have retired on the proceeds!

At the end of the meeting it was announced that Mr. Reginald Pole had offered a challenge cup for a race from Brooklands to Brighton and back. Particulars and date of the contest will be announced in due course.—G. D.

THE ROYAL AERO CLUB.

The following Clubs within the Empire have become affiliated to the Royal Aero Club: The Associated Australian Aero Clubs (Victoria, New South Wales, South Australia, Tasmania, and Queensland), The Aero Club of India and Burma, The Aero Club of South Africa, The Aero Club of East Africa, and the Singapore Flying Club.

The following British Clubs form the Associated Clubs General Council of the Royal Aero Club: The Royal Aero Club, the Bristol and Wessex Aeroplane Club, the Halton Aero Club, the Hampshire Aeroplane Club, the Household Brigade Flying Club, the Lancashire Aero Club, the Leicestershire Aero Club, the Liverpool and District Aero Club, the London Aeroplane Club, the Midland Aero Club, the Newcastle-upon-Tyne Aero Club, the Nottingham Aero Club, the Plymouth Aero Club, the Royal Aircraft Establishment Aero Club, the Suffolk and Eastern Counties Aeroplane Club and the Yorkshire Aeroplane Club.

AN EAST AFRICAN AWARD.

Mr. T. Campbell Black, a director of Wilson Airways Ltd., of Nairobi, and a pilot who has made several flights between Kenya and England and return, has been awarded the Mansfield Robinson Gold Trophy for 1929 for the most meritorious flight in East Africa made by a member of the Aero Club of East Africa.

The award has been made for Mr. Campbell Black's flight from Nairobi to Mombasa and back in a day, a distance of about 530 miles, in a Gipsy-Moth with a passenger.

COLD FLYING.

In 32 consecutive days from Jan. 9, 1930, two Gipsy-Moths equipped with skis belonging to the Sioux Lookout Winter Flying School of the Ontario Provincial Air Service flew on 54 hours' dual and 273 hours' solo training in an average temperature of 12 degrees below zero. The lowest temperature experienced during this period was 42 degrees below zero. This school is supervised by Major John Leech.

No failures or interruptions happened during this period even in the coldest weather and ten pupils completed training sufficient to allow them to qualify for commercial licences on Moth seaplanes at Sault Ste. Marie, after the spring break-up.

A third Moth at the Sioux Lookout base during the same period flew 30 hours on emergency work carrying doctors to remote points inaccessible by other means and on wireless tests and service organisation work.

Also during this period Major Leech flew from Sault Ste. Marie to Sioux Lookout in a day, a distance of 500 miles, in a temperature which varied from 30 to 42 degrees below zero.

The Ontario Provincial Air Service was responsible for the introduction of the Moth into Canada in 1927, at a time when the possibilities of the light aeroplane for practical commercial use were considered with misgivings by the uninitiated. Since that date the Moth has given sterling service in every kind of work, ranging from forest fire protection, light transport, instruction, etc., and the Provincial Air Service has at no time regretted its enterprise in choosing this type to replace its heavy war-time design flying-boats of four times the power of the Moth.

SAUNDERS-ROE DEVELOPMENTS.

Saunders-Roe Ltd., of East Cowes, are preparing to produce a family of flying-boats to range from the Cutty Sark four-seat cabin boat which is already in production, to a big boat weighing 30 tons.

The original Cutty Sark has been flown extensively and has given every satisfaction to its constructors. Experience gained with this machine has suggested several minor modifications which have been incorporated in the production type.

One modification which has proved very successful is the fitting of an amphibian undercarriage. This has extended the utility of the machine enormously, and made it eminently suitable for use in the dominions and Colonies.

The next step up from the Cutty Sark is the Windover, a 5-seat cabin flying-boat, and this will be followed by the Flying Cloud, a 6—8-seat flying-boat. Both these craft are now under construction. The principal difference between these two types and the Cutty Sark will be in the cabin lay-out and the engine installation.

The Cutty Sark has now been arranged to take a very large range of power plants. These include two Cirrus-Hermes, one Armstrong Siddeley Lynx, either geared or ungeared, three Armstrong Siddeley Genet, two Armstrong Siddeley Genet-Major, and two D.H. Gipsy I or Gipsy II. With this range of engines and the alternative flying-boat or amphibian equipment the Cutty Sark may now be supplied in thirteen different models.

GLIDING.

The Royal Aero Club and Gliding.

The following sub-Committee of the Royal Aero Club was appointed on Feb. 26 to confer with the representatives of the British Gliding Association:—Lieut.-Col. M. O'Gorman, C.B., Mr. H. S. Broad, A.F.C., Major H. A. Petre, D.S.O., M.C.

The qualifications laid down by the *Fédération Aéronautique Internationale* for Certificates for persons flying Gliders were considered. The Committee decided that these should be known as "Gliding Certificates."

The qualifications are as follows:—

Licence A. The Candidate must make a flight for a duration of 30 seconds followed by a normal landing.

Licence B. The candidate must make a flight for a duration of one minute with two curves in the form of an "S," followed by a normal landing. Before attempting test B the candidate must have made two flights of at least 45 seconds each.

Licence C. The candidate must make a flight of at least five minutes' duration and at a height greater than the height of departure.

The London Gliding Club.

At an early date members of the London Gliding Club will be invited to assist in the preliminary trials of two primary-type training gliders.

The intention is to launch these gliders from level ground to ensure that the controls are adequate. If the tests are successful, the gliders will be taken to Ivinghoe, and flown there at the first opportunity.

The Club is to be congratulated on securing Mr. Handley Page as a Vice-President. The patronage of no less a personage than the Chairman of the S.B.A.C. augurs well for the Club and the movement.

The Kent Gliding Club.

On Mar. 2 the Kent Gliding Club gave a public demonstration of their glider at the old Detling Aerodrome, close to the main Maidstone—Sittingbourne road. The glider had been on show for the previous week and much local enthusiasm had been raised.

There was a surprisingly large attendance and the Club must have collected quite a useful sum of money from the gate-money which was charged. The Club confined their efforts to launching their glider from level ground, to which it rapidly returned. This performance was successfully repeated a good many times.

One considers that such a public demonstration is unfortunate and can only do harm to the movement as a whole. In future there will probably be some difficulty in convincing most of the crowd who witnessed this display that Gliding and Soaring have any future as a sport.

This is all the more unfortunate as the extraordinary energy and enthusiasm displayed by the Kent Club has resulted in their being the first club to design, build and operate a glider in England since the meeting of enthusiasts held on Dec. 4.

The Gliding Club of South Australia.

There are a number of enthusiasts who wish to form a gliding club in Leicester. Mr. A. A. McLaren is acting as organiser and people interested should write to him at 166, St. Saviours Road, Leicester.

The Gliding Clubs of South Australia.

On Jan. 1 the Gliding Club of Australia held its inaugural meeting at Para Hills, close to Adelaide. The president is Mr. G. K. Rice Oxley. A number of successful demonstration flights were made in the "Zogling" type glider, which was first flown by Mr. P. J. Pratt. He then handed the glider over to the new club.

Presumably this glider was built by Mr. Pratt's company, the Aircraft Manufacturing and Supply Co., of Australia Pty. Ltd. This firm also built the glider for the Geelong Club, the formation of which was reported in THE AEROPLANE for Nov. 20.

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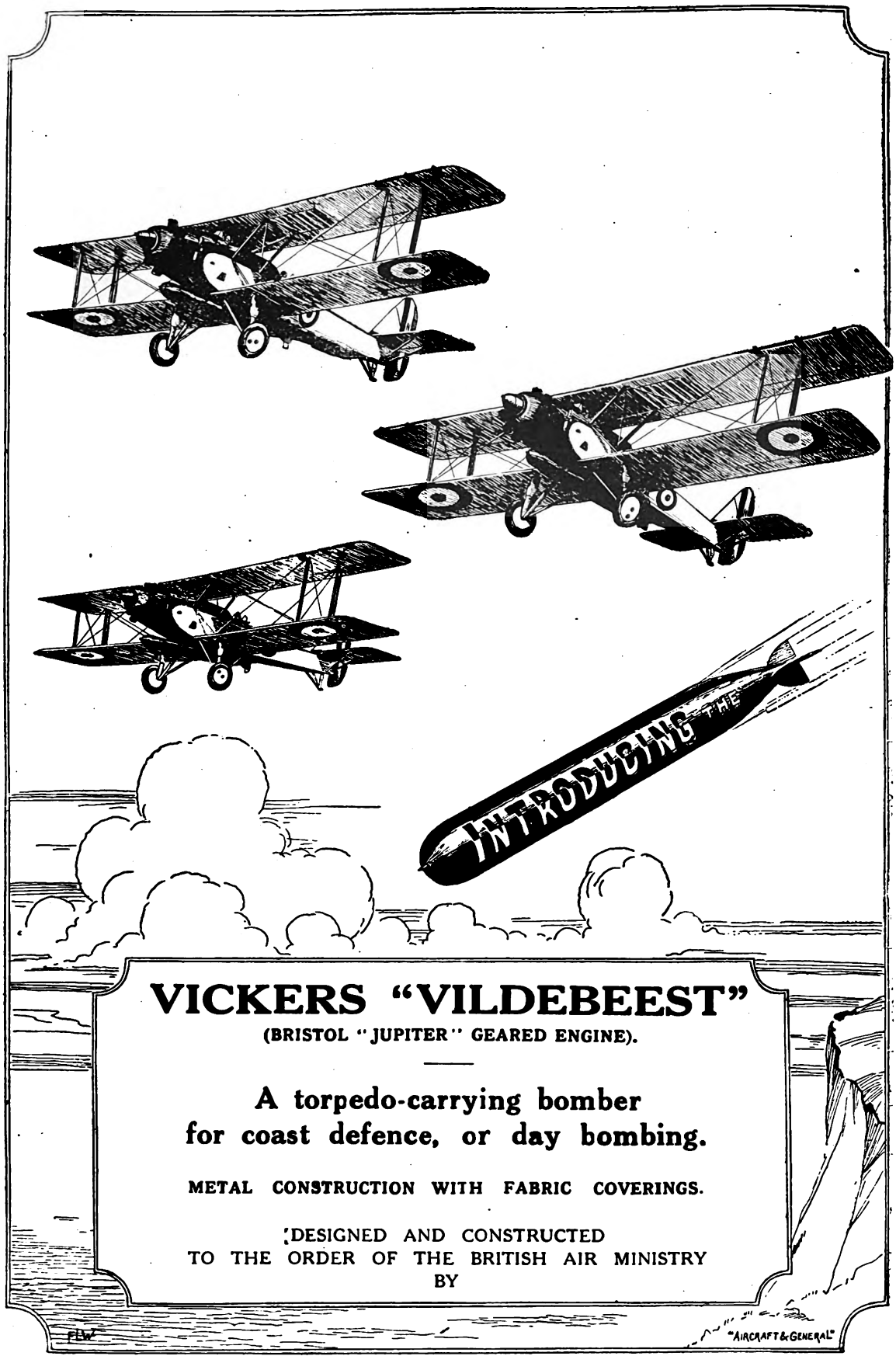

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THE OPERATIONS OF THE BRITISH LIGHT AEROPLANE CLUBS AND FLYING SCHOOLS IN 1929.

CLUBS.	Total No. of hours flown in 1929.	Instruction of pupils.	Solos by pupils.	Solos by "A" pilots.	Testing joy riding, etc.	Private owners' flying.	Number of pupils training as at Dec. 31st, 1929.	Number of pupils qualified for "A" licence.	Number of pupils qualified for "B" licence.	Number and types of machines in use.	Remarks.
The London Aeroplane Club (S)	2634 hr. 15 min.	1136 hr. 40 min.	274 hr. 30 min.	1019 hr. 45 min.	203 hr. 20 min.	—	175	51	2	6 Moths	—
The Lancashire Aero Club. (S	1228 hr. 35 min.	491 hr. 16 min.	74 hr. 20 min.	663 hr.	—	—	27	49	—	—	—
The Midland Aeroplane Club. (S)	1399 hr.	674 hr. 28 min.	496 hr.	10 min.	228 hr. 22 min.	200 hr.	35	31	—	4 Moths	—
The Yorkshire Aeroplane Club. (N.F.S.) (S)	1125 hr. 25 min.	432 hr. 25 min.	130 hr. 55 min.	517 hr. 55 min.	54 hr. 10 min.	250 hr.	40	19	—	3 Bluebirds	—
The Newcastle-upon-Tyne Aero Club. (S) ...	1245 hr. 32 min.	618 hr. 35 min.	134 hr. 40 min.	335 hr. 42 min.	156 hr. 35 min.	—	161	24	3	3 Moths	—
The Hampshire Aeroplane Club. (S) ...	1674 hr.	803 hr.	229 hr.	505 hr.	137 hr.	Not available	82	37	—	2 Moths 1 Cirrus Avian 1 Cirrus Spartan	—
The Suffolk and Eastern Counties Aeroplane Club. (S)	No figures received.										
The Norfolk and Norwich Aero Club. (S) ...	951 hr. 10 min.	370 hr. 45 min.	51 hr. 45 min.	457 hr. 20 min.	71 hr. 20 min.	No records	28	11	—	2 Moths 1 Avian	—
The Bristol and Wessex Aeroplane Club. (S)	1041 hr. 5 min.	584 hr. 40 min.	125 hr. 20 min.	153 hr. 35 min.	177 hr. 30 min.	—	120	22	—	3 Moth "X"	—
The Cinque Ports Flying Club. (S)	867 hr. 45 min.	436 hr. 40 min.	95 hr. 35 min.	212 hr. 15 min.	86 hr. 45 min.	—	32	18 abinitio 3 ex-R.F.C. & R.A.F.	—	2 Moths	—
The Scottish Flying Club. (S)	1111 hr. 15 min.	467 hr. 20 min.	91 hr. 5 min.	447 hr. 40 min.	105 hr. 10 min.	—	23	17	—	1 Avian 5 Moths	—
The Nottingham Aero Club. (N.F.S.) (S) ...	No figures received.										
The Liverpool and District Aero Club. (S)	1428 hr. 30 min.	665 hr.	157 hr. 55 min.	476 hr. 50 min.	128 hr. 45 min.	Not known	21	36	—	4 Avians	—
Berks Bucks and Oxon Flying Club. (N.F.S Ltd.) (S)	347 hr.	177 hr.	89 hr.	51 hr.	20 hr.	183 hr. 50 min.	92	16	—	3	From Oct. 1. 1929.
The Southern Aero Club	950 hr.	200 hr.	50 hr.	100 hr.	450 hr.	150 hr.	20	5	—	1 Avian	—
The Northamptonshire Aero Club.	502 hr. 45 min.	301 hr. 50 min.	55 hr. 15 min.	21 hr. 15 min.	124 hr. 15 min.	225 hr.	40	3	—	2 Moths	—
The Household Brigade Flying Club. ...	184 hr. 15 min.	113 hr. 20 min.	70 hr.	55 min.	—	—	18	15	1	1 Moth	—
The Leicestershire Aero Club	177 hr. 20 min.	67 hr. 50 min.	1 hr. 40 min.	87 hr 45 min.	20 hr. 5 min.	—	18	1	—	1 Moth	From Sept 13, 1929.
The Aircraft Operating Co. Flying Club. ...	60 hr.	30 hr.	3 hr.	10 hr.	17 hr.	—	9	1	—	1 Moth	Up to Nov. 31, 1929.
The London Air Park (N.F.S.) (S)	No figures received										
SCHOOLS.											
Airwork Ltd.	1121 hr. 20 min	530 hr. 55 min.	113 hr. 15 min.	104 hr. 20 min.	372 hr. 50 min.	—	43	31	—	5 Moths 1 Gipsy Bluebird 1 Hermes Avian	From May, 1929.
The Brooklands School of Flying	1684 hr. 20 min.	983 hr. 15 min.	176 hr.	45 min.	488 hr. 20 min.	No record	39	35	1	3 Avro 548 2 Avro 504K 13 Moths 1 D.H.50	—
The De Havilland School of Flying.	—	R.A.F. Reserve 740 hr. 25 min. 3066 hr. 5 min. Civil 867 hr. 45 min. 277 hr. 45 min.		75 hr.	1764 hr. 45 min.	No record	250 Approx.	21	14	1 D.H.9 14 Moths	—
The Henderson School of Flying.	540 hr	380 hr.	120 hr.	40 hr.	—	—	—	17	7	2 Moths	—
The Haldon School of Flying.	355 hr.	146 hr. 41 min.	included owners'	in private flying.	109 hr. 35 min.	310 hr.	12	6	—	1 Cirrus Avian 1 Moth	—
The Phillips and Powis School of Flying. ...	862 hr.	450 hr.	134 hr.	43 hr.	187 hr.	48 hr.	134	14	—	7 Moths 1 Avro	—

NOTE: (S) denotes subsidised Clubs.

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Light aeroplanes of robust construction and high performance. Prices from

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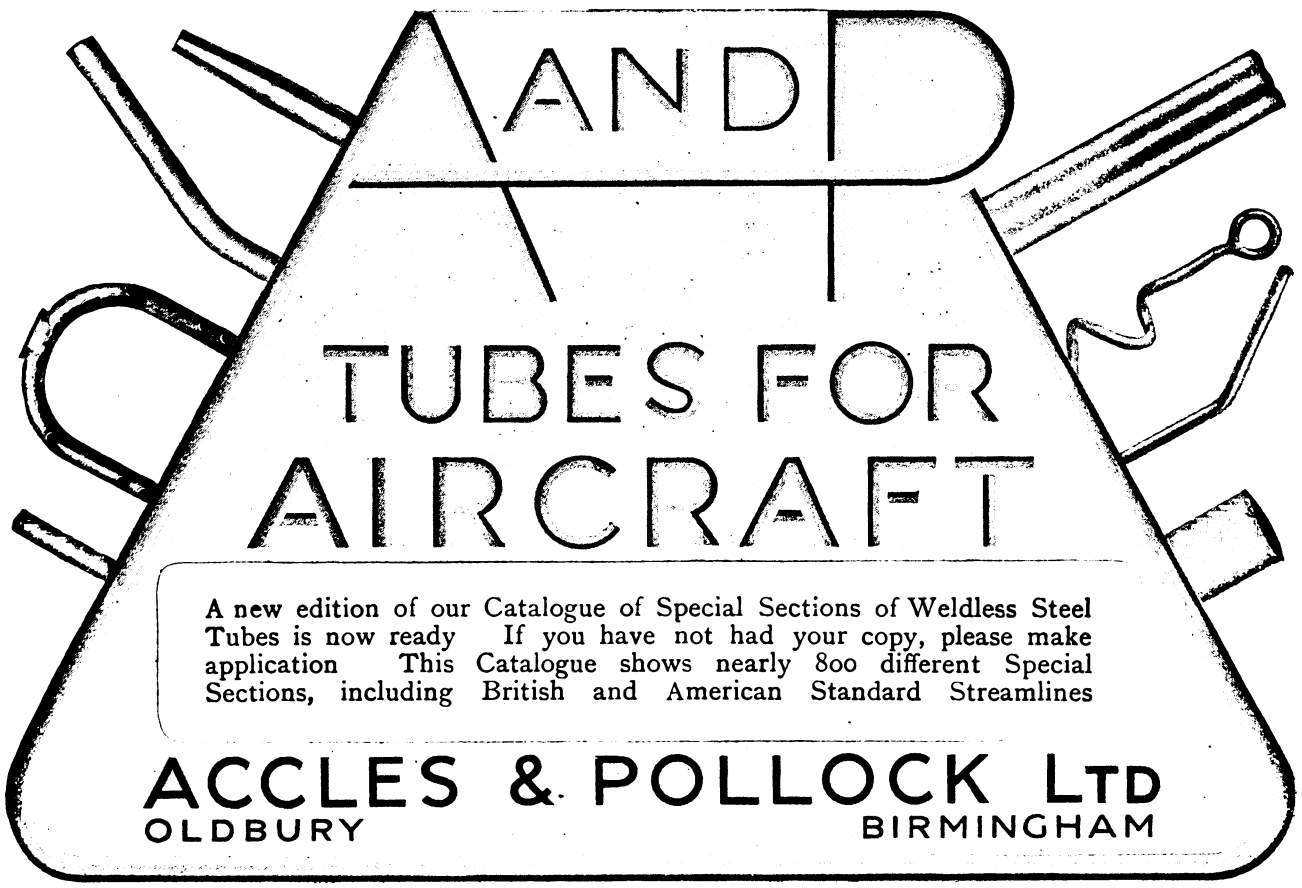

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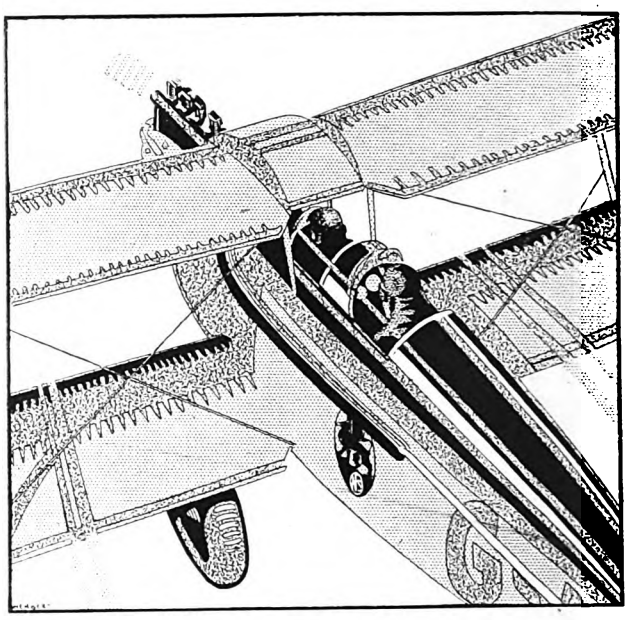

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THEY INSTRUCT you in the art of flying, and turn you out as a thoroughly sound and proficient pilot at a minimum of expense.

THEY SUPPLY the products of all the leading constructors; so that they have a machine to suit the individual requirements of each potential owner. There is the Desoutter Sports Coupé, constructed to carry three in a roomy cosy cabin; the Moth III is a similar type; or there is the Blackburn-Bluebird, a side-by-side two-seater. Dual cockpit models are available also, such as the Gipsy-Moth or the Avian; and single-seaters by various manufacturers. You can see them all. Most machines are stocked for immediate delivery.

THEY SERVE the owner-pilot in a manner unexcelled by any other organisation. They are all practical men of aviation, ready to assist and advise upon the care of the machine, and their technical staff is available to keep the craft in perfect order. The N.F.S. "engine-service" scheme permits an owner to exchange the engine for one of a similar kind, saving time on overhauls; and spares of all kinds are delivered on demand.

THEY ORGANISE and plan aerial tours, so that to wherever the private owner may wish to travel, at home or abroad, nothing is lacking for his reception, his comfort or his safety. The N.F.S. Touring Organisation commands service the world over; and can supply everything necessary for success. Seek the advice of N.F.S. . . . . the world's largest organisation for the furtherance of private flying.

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COMMERCIAL AERONAUTICS.

AVIATION IN CHINA.

The Deutsche Luft Hansa has completed another link in the network of air lines which this concern is organising outside Germany. An agreement has been signed between the Chinese Minister of Communications and the Luft Hansa by which the latter is given the right to carry air mails from Germany to China by the Northern route. This presumably means by way of Siberia.

One of *The Times* correspondents in China contributed a long article to that paper on Mar. 3, in which he sums up the position in regard to Chinese aviation. He says that China is notably deficient in communications, and is waiting to take immediate advantage of flying services as an immense improvement on the routes by sea, rivers, bad roads, and inadequate and deteriorated railways. Mails at present follow the passenger routes, and, especially since the deterioration of the postal service, are painfully slow and irregular.

Flying will come in China as a godsend to business. All commercial enterprise is at present handicapped by the fact that agents have to spend so much of their valuable time in travelling, and because mails are so slow and telegrams so uncertain. Affairs of Government constantly suffer by the slowness of communications.

A busy Shanghai man would pay anything for quick transport to Canton, Hankow, Tientsin, and Mukden, and there are thousands of firms, Chinese and foreign, who would pay ten times the current rate for postage in order to send letters by aeroplane in as many hours as they now take days to reach their destination.

Because the interior is in such a disturbed state much irregular taxation is levied on material either being taken into or from the interior. This is especially the case with silver, the aerial transport of which would pay handsomely.

The possibilities for aviation, in conjunction with the establishment of a Government eager to adopt modern inventions, have brought many competitors for such business to Nanking and other centres.

Nanking has taken delivery of 32 Junkers aircraft, including 24 light machines for military instruction, seven seaplanes of greater capacity, and one freight carrier. Five American Ryan monoplanes were sold at Hankow, and at Canton five Ryan monoplanes and four Waco biplanes. Four D.H. Moths have been sold in Hankow and five in Nanking.

THE AEROPLANE for May 15, 1929, published an interesting summary of the situation and reported the signing of a contract between the Nanking Government and the Curtiss-Robertson Company.

The Curtiss Company admitted that they were prepared to venture a very large sum of money in Chinese Aviation and contracted to establish three regular air mail services and schools for training Chinese pilots and mechanics, all costs and expenses to be provided by the company.

The company obtained the right to operate other routes on its own account and to manufacture aircraft in China.

The same article in THE AEROPLANE referred to a scheme whereby clubs were to be formed all over China; the formation of such clubs under British guidance to lead to orders for British machines.

The Times article concludes by pointing out that the Chinese seem to imagine that flying is mainly a matter of purchasing machines, and that ground establishments are subsidiary adjuncts of no particular importance. A recent contract to supply British machines to one provincial capital is reported to have been cancelled.

Apparently the agent delivered a part of the order in packing cases, and was unable to provide technical assistance to ensure correct assembly. The Chinese did the work themselves, and, when flown, the machines crashed, with the result that it was decided to take no more of that make. One concludes that attempts to sell aeroplanes in China are not likely to be successful unless the sellers are able to supply some degree of service, or at least are able to ensure that machines are in a condition to be flown before giving delivery.

THE CAPE-TO-CAIRO AIR ROUTE.

The Cairo—Cape Town survey party of Imperial Airways, which consists of Mr. T. A. Gladstone, Mr. C. F. Wolley Dod and Mr. F. Tymms, has reached Nairobi. According to the Nairobi correspondent of *The Times*, the whole of the southern section of the route is practically ready, but much work still remains to be done in the northern half. The first stage of the service, therefore, is not likely to be opened in June as was expected, but in October or November, with the full route to the Cape to open in April next year.

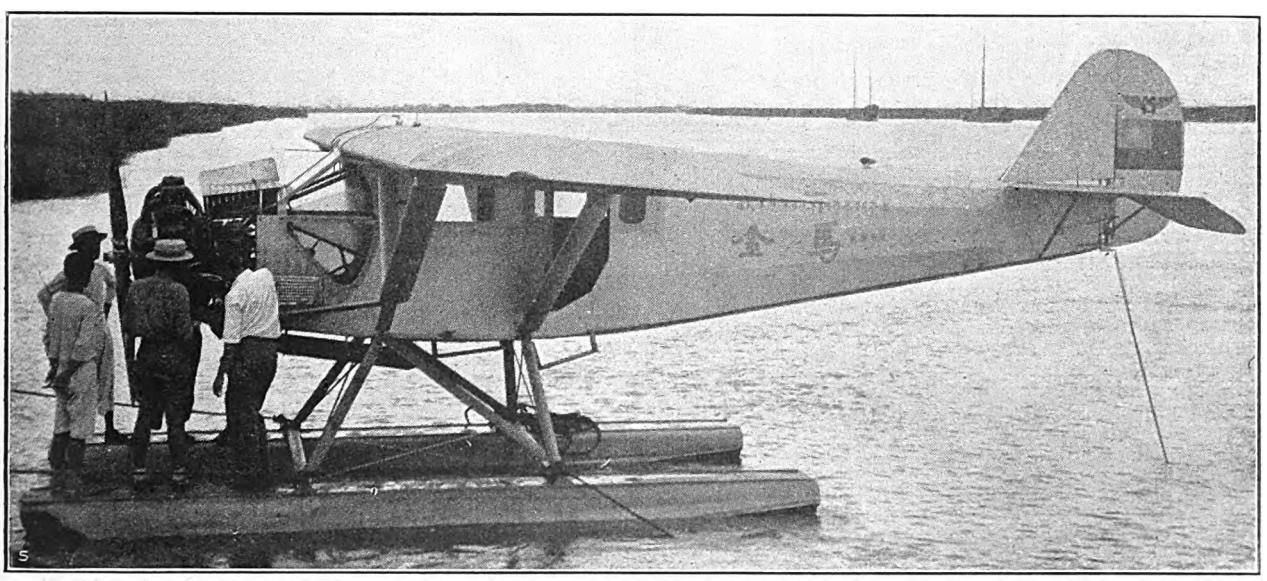
Minor changes have been made in East Africa, such as the selection of Moshi instead of Arusha, and Port Bell, near Kampala, instead of Jinja. Butiaba has also been selected as a stopping point in order to make a contact with the Congo.

The full route may now be Cape Town, Victoria West, Johannesburg, Pietersburg, Bulawayo, Salisbury, Broken Hill, Mpika, Mbeya, Dodoma, Moshi, Nairobi, Kisumu, Port Bell, Butiaba, Juba or Mongalla, Malakal, Kosti, Khartoum, Atbara, Wadi Halfa, Aswan, Luxor, Assuit, Cairo, and Alexandria.

There may be a temporary extension from Kisumu to Mwanza to serve Tanganyika until the route via Dodoma is ready. There will be no mail contract, but each machine will carry mails which will be surcharged 5d. or 5½d. between East Africa and London. The headquarters of the Southern section will be at Johannesburg, and of the northern section at Alexandria. There will be a weekly service each way, with the machines crossing at Nairobi.

AIR MAIL SERVICES.

In the House of Commons on Feb. 26, in reply to Lieut.-Commander Kenworthy, the Under-Secretary of State for Air said that he could not give a definite date for the establishment of an air mail service from this country to Australia. No arrangements had been made with the Netherlands Government for the use of the landing grounds, aerodromes and facilities for flying-boats in the Dutch East



CHINESE CIVIL AVIATION.—A Ryan monoplane which made the first non-stop flight from Canton to Nanking in 6½ hours.

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Indies for this purpose. He did not expect there would be any trouble in the negotiations with Holland, especially in view of the fact that the Dutch had facilities from us at Singapore. The whole matter was under the jurisdiction of the Indian Government and the Indian Government had simply said to the British as well as to the Dutch, that until meteorological, wireless and ground arrangements were complete, it was inadvisable to have these flights.

Mr. Malone asked why, in the Imperial Airways England to India route, it was necessary to proceed to Athens by rail. Mr. Montague replied that up to the present arrangements had not been concluded with the Italian Government which were commercially satisfactory to Imperial Airways, for the permanent operation of the air route to Athens via Genoa and Naples. The Company had therefore diverted the service for the present to a Central European route. Until more experience had been gained of this new route, and in order to ensure as far as possible regularity in the arrival of mails, the company had deemed it advisable during the winter months to send mails by train between Cologne and Athens on the outward journey and between Athens and Paris on the return journey. The Company hoped to be in a position to make regular flights over this route in the spring. There was no shortage of aircraft.

THE FREEDOM OF THE AIR.

In the House of Commons on Feb. 26, Commander Southby asked the Secretary of State for Foreign Affairs whether, within the last six months, any representations had been received from foreign Powers and, if so, which, as to the flight of British aircraft over their respective territories.

Mr. A. Henderson said that various representations had been received during the last six months from the Danish, Persian, German and Italian Governments as to the flights of British aircraft over their territories.

AIR MAILS TO INDIA.

In the House of Commons on Feb. 25, in reply to a question by Mr. Wardlaw-Milne, the Postmaster-General said that since the beginning of this year the average weekly weight of air mail carried to India had been about 550 pounds, and the corresponding weight from India about 440 pounds. Apart from a very marked increase in both directions during the Christmas period he could not say that there had recently been any definite tendency for the traffic to rise or fall.

LORD PASSFIELD AND AERIAL SURVEY.

THE AEROPLANE for Dec. 18, 1929, reported the approval by the London Chamber of Commerce of a memorandum drawn up by its East African and Civil Aviation sections. This memorandum was submitted to the Government.

The Times for Mar. 3 reports that Lord Passfield in his reply has informed the London Chamber of Commerce that the subject of air surveys in the Colonies is at present receiving his careful consideration, and that the special needs of Tanganyika Territory will be taken into account in the formulation of a policy on this subject.

THE LATEST CANADIAN AIR MAIL.

On Mar. 3 the air mail route between Winnipeg, Regina, Saskatoon, Calgary and Edmonton was inaugurated. The contract for this route was awarded to Western Canada Airways by the Canadian Government. This company have bought a number of Fokker F.14 six-seat monoplanes (525 Pratt and Whitney Hornet engines) for this service.

In Winnipeg the occasion was marked by the lighting for the first time of a beacon light erected by the Hudson Bay Company.

ROYAL TRANSPORT IN KENYA.

On Feb. 26 Mr. Campbell Black flew the D.H. Gipsy-Moth, which belongs to Wilson Air Lines, to the camp of H.R.H. the Prince of Wales, on the Masai Reserve, Tanganyika. When he had delivered his message he received an invitation to stay at the Royal Camp.

During this stay he piloted the Prince on several flights. When Mr. Black flew back to Nairobi he carried Sir Edward Grigg, the Governor of Kenya, as passenger.

A VICEREGAL FLIGHT.

On Mar. 4 the Viceroy and Lady Irwin flew from Delhi to Meerut to watch matches in the inter-regimental polo tournament. After tea they flew back to Delhi, arriving just before the Imperial Airways air-liner with the English mails and passengers arrived. Among the passengers on this machine was Mr. Richard Maconochie, the new British Minister to Kabul.

ANOTHER CHANCE FOR AIR SURVEYORS.

Aerial photographs were recently exhibited before the Croydon County Licensing Justices as evidence of the populous character of the district for which a licence was sought.

History does not record whether these maps inclined the scales of justice but aerial photographers will no doubt be elated to learn of another use to which their talents can be put.

TWO NEW WORLD'S RECORDS.

The Royal Aero Club has been notified by the *Fédération Aéronautique Internationale* of the granting of the following World's Records:—

Class C (Aeroplanes), carrying 500 *kgs. useful load (France).*
Aircraft: Breguet XIX Special (600 h.p. Hispano-Suiza engine).
Pilots: MM. Costes and Codos.
Place: Istres.
Date: January 17-18, 1930.
Performance: Duration, 23 hours 22 minutes. Distance, 4.361.950 kms. (2.708.7 miles). Speed over 2,000 kilometres, 214.553 km.p.h. (193.2 m.p.h.).

Class C (Light Aeroplanes—1st Category (two-seater)) (Italy).
Aircraft: Fiat A.S.1 monoplane (85 h.p. Fiat A.50 engine).
Pilot: Signor Renato Donati.
Place: Montecelio, Rome.
Date: January 19-20, 1930.
Performance: Duration, 29 hours 4 minutes. Distance in a closed circuit, 2,746.2 kms. (1,705.4 miles).

THE FRENCH HEIGHT RECORD

On Jan. 19 M. Lemoigne reached a height of 11,797 m. (38,690 ft.) in a Gourdou-Leseurre monoplane (420 h.p. supercharged Gnôme-Rhône Jupiter engine). This figure, which has been checked by the laboratory of the *Arts et Métiers*, is a new French height record.

The World's Record is held by Herr Neuenhofen at 12,739 m. (42,580 ft.), who reached this height in a Junkers monoplane, also fitted with a supercharged Jupiter engine.

MORE ITALIAN RECORDS.

On Feb. 22 the Caproni 90P.B. giant bomber biplane (six 1,000 h.p. Isotta Fraschini Asso-1000 engines) is claimed to have broken six World's records. These are for the greatest load lifted to 2,000 m. (6,560 feet), the greatest altitude reached while carrying 7,500 kgs. (16,530 lbs.) and 10,000 kgs. (22,000 lbs.), and the longest duration carrying 5,000 kgs. (11,000 lbs.), 7,500 kgs. (16,530 lbs.), and 10,000 kgs. (22,000 lbs.).

Unfortunately no actual figures concerning these attempts have yet been received.

A NEW LOENING COMPANY.

Mr. Grover Loening, founder of the Loening Aeronautical Corporation, and later director of the Keystone Aircraft Corporation and the Curtiss-Wright Corporation, has resigned from the posts and has formed the Grover Loening Company, of which he is president and chief engineer.

This company will specialise in the development of new aircraft designs under contract with both the Government and private manufacturing companies.

HEINKEL EXPANSION.

The Ernst Heinkel Flugzeugwerke G.m.b.H. of Warnemünde, has purchased an additional factory at Rostock, about 10 miles from Warnemünde. The new works have both railway connections with the main railway lines and waterway connections with the Warnow River, which flows into the Baltic at Warnemünde. The new factory will be used chiefly for production.

The Warnemünde Works will continue to be used as the head office and for the design and construction of new and experimental types.

IMPORTANT DATES.

Mar. 6.—Major F. M. Green's and Mr. H. C. H. Townend's joint lecture before the Royal Aeronautical Society.
Mar. 6 and 7.—Boxing, R.A.F. Championships at Uxbridge.
Mar. 8.—Rugby Football, R.A.F. v. Coventry at Coventry.
Mar. 8, 10.—International Gliding Congress at Darmstadt.
Mar. 10.—Herr Wronsky's lecture before the Royal Aeronautical Society.
Mar. 12.—Rugby Football, R.A.F. v. Civil Service at Halton.
Mar. 12.—Annual General Meeting of the Royal Air Force Club.
Mar. 15.—Assoc. Football, R.A.F. v. Army at Homerton.
Mar. 22.—Rugby Football, R.A.F. v. Army at Twickenham.
Mar. 25.—Annual General Meeting of the R.Ae.S.
Mar. 26.—Annual General Meeting of the Royal Aero Club.
Mar. 27.—Inaugural Meeting of the British Gliding Association.
April 3.—M. M. P. Grimault's lecture before the Royal Aeronautical Society.
April 6.—The third Ashwell-Cooke Challenge Competition at Lympne.
April 19.—Leicester Flying Meeting (Leicestershire Aero Club).
May 31.—Bristol Air Pageant (Bristol and Wessex Aeroplane Club). Official opening of Bristol Municipal Aerodrome.
June 9.—Northamptonshire Aero Club's meeting at Sywell.
June 10—15.—F.A.I. Conference, Paris.
June 21.—Annual Air Rallye at Haldon Aerodrome.
June 21.—Competition for the Gwynn Maddocks Cup at Heston.
June 26.—Ipswich Air Pageant (Suffolk and Eastern Counties Aeroplane Club). Official opening of Ipswich Municipal Aerodrome.
June 27.—Annual Dinner, R.A.F. Dinner Club.
June 28.—Royal Air Force Display at Hendon.
July 5.—King's Cup Air Race (Royal Aero Club).
July 20—Aug. 7.—International Touring Competition.
July 26.—Norwich Flying Meeting (Norfolk and Norwich Aero Club).
Sept. 1—6.—Fifth International Congress on Air Navigation at The Hague.
Sept. 6—28.—International Aero Exhibition at Stockholm.
Sept. 20.—Liverpool Air Pageant (Liverpool and District Aero Club and Lancashire Aero Club).
Nov. 28—Dec. 14.—International Aero Exhibition at Paris.

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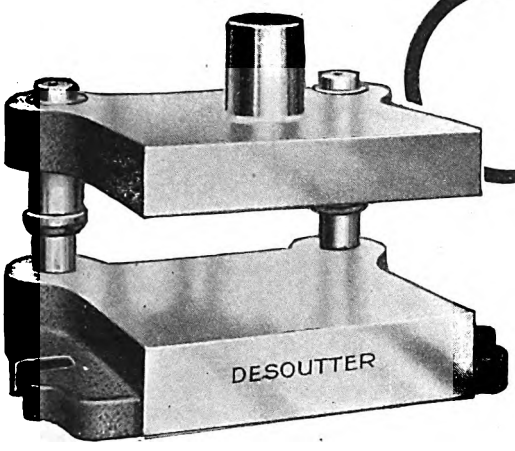

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THE LONDON TERMINAL AERODROME.

ANALYSIS OF FIGURES FOR PAST WEEK.

Trips per Day.—Sunday, 7; Monday, 16; Tuesday, 16; Wednesday, 16; Thursday, 18; Friday, 19; Saturday, 17.

IMPERIAL AIRWAYS LTD.:

London—Egypt—India: London—Le Touquet—Paris—Basle—Zurich: London—Ostend—Brussels—Cologne and return: Machines 83, passengers 176, freight 18 tons. India Route: Inward, passengers 0, mail 673 lbs.; outward, passengers 0, mail 665 lbs.

AIR UNION:

Paris—London: Machines 32, passengers 107, freight 8¾ tons.

K.L.M.:

Amsterdam—Rotterdam—London: Machines 12, passengers 46, freight 5¼ tons.

SABENA:

Brussels—London: Machines 14, passengers 25, freight 2 tons.

DEUTSCHE LUFT HANSA A.G.:

Amsterdam—London: Machines 12, passengers 24, freight 2¾ tons.

MISCELLANEOUS:

British machines 1, passengers 1.

Foreign machines 0, passengers 0.

Total number of trips by British machines, 39, carrying 177 passengers. Foreign machines, 70, carrying 202 passengers.

COMPARATIVE FIGURES.

Week ending Mar. 1:

Machines, 109; Passengers, 379; Crews, 285; Total personnel, 664.

Corresponding week, 1929:

Machines, 85; Passengers, 261; Crews, 169; Total personnel, 330.

Corresponding week, 1928:

Machines, 111; Passengers, 482; Crews, 220; Total personnel, 702.

Corresponding week, 1927:

Machines, 77; Passengers, 227; Crews, 123; Total personnel, 350.

Corresponding week, 1926:

Machines, 76; Passengers, 198; Crews, 93; Total personnel, 291.

Corresponding week, 1925:

Machines, 69; Passengers, 137; Crews, 81; Total personnel, 218.

Corresponding week, 1924:

Machines, 88; Passengers, 123; Crews, 140; Total personnel, 263.

Corresponding week, 1923:

Machines, 61; Passengers, 197; Crews, 116; Total personnel, 312.

Corresponding week, 1922:

Machines, 44; Passengers, 110; Crews, 74; Total personnel, 184.

Corresponding week, 1921:

Machines, 31; Passengers, 69; Crews, 35; Total personnel, 104.

CROYDON NOTES.

A vague, uneasy feeling is in the air at Croydon Aerodrome, similar to the sensation caused by a new undervest, which experts put down to the slightly premature arrival of Spring.

Other signs of the vernal equinox are the lamb-like gambols of Works and Buildings on the edge of the tarmac, the stealthy flight of Messrs. Wilson and Matthews to Luton, presumably to obtain their new season boaters straight from the hatter's lathe, and the glad song of Pilot Higgins about the place, some notes of which owing to his habit of inhaling strong tea through the meshes of a walrus moustache, are almost equal in passionate intensity to the liquid "glug glug" of the amorous nightingale.

Monday was a particularly mild day and our oldest inhabitant was observed to poke his head up tortoise-like from the depths of the leather flying coat in which he habitually hibernates and ask what the time of year was. On being told it was yet March, he suddenly retired below his fur collar with the remark, "Balmy," though it is uncertain whether this referred to the bystanders or the prevailing weather conditions.

As a matter of fact, Spring at Croydon Aerodrome does not come into force until the burgeoning of the first bunch of American Tourists, and anyone contemplating casting a clout should remember Sharkey, and not cast it when an American is handy, nor should the words "Great Scott" be used on observing the first American of the season by those who have any respect for their sciatic nerve.

More serious signs of Spring are the increase in passenger traffic on the Paris lines and the heavy cut flower traffic between Holland and Covent Garden Market. Cut flowers by air last a good deal longer than those by boat, and can be more lightly packed.

The Sabena Company have been making active preparations for their Summer night flying services between London and Brussels, and have made a number of night flights from Croydon to Lympne and back, and from Croydon to St. Inglevert and back. The Sabena chief pilot, Mr. Cocquyt, who has made these night flights, reports favourably upon the Croydon and Lympne lighting, but finds the route otherwise inadequately lit. It is of interest that he finds the rotating white floodlight at Croydon preferable to the red neon beacon under normal weather conditions, the former being visible much further away than the latter.

Mr. "Jerry" Shaw, who has recently returned from a tour of the East, was particularly impressed with the possibility of Commercial Aviation in the Sudan where flying has that great advantage we sigh for in vain in Europe, that what the aeroplane does in comfort, cleanliness and coolness in a few hours is only performed by ground transport in very many days in discomfort, dirt and dismal heat. In the Sudan the R.A.F. have got lots of Aerodromes and are an extremely pleasant bunch who welcome people to their Aerodromes, and do the casual aviator proud in every way. "Jerry" says the R.A.F. are so popular with the natives that if a little disciplinary bombing of some Chief is necessary, the old boy takes it as rather a compliment and asks the bomber over to tea with the bombee the next day.

National Flying Services have opened an attractive orange and black Air Taxi Office at Grand Buildings, Trafalgar Square, complete with every modern convenience, including our old friend Mr. Eskell, their new Traffic Manager. It is as easy to nip in to the office and order an air taxi as to get a ground taxi off the rank outside, and once you have ordered it Mr. Eskell will see that you darn well ride in it.

It is said that most of the N.F.S. pilots are wandering about Hanworth, tripping over Moths, Bluebirds and other fauna, with their heads buried in abstruse tomes on Air Navigation, with a view to passing the forthcoming Air Ministry examination on that subject.

Without having lost one's faith in that delightful branch of Astrology altogether, one must confess to having unshipped the jolly old compass from the watch chain since hearing that Col. Henderson does not believe in what our American friends *will* call "Avigation."—SPRY.

A WARNING ABOUT CARDINGTON.

Although the notice restricting the flight of aircraft in the vicinity of Cardington Mooring Tower has been cancelled, airmen are warned by Navigational Warning No. 5 of year 1930 that Cardington Airship Station is only available in cases of emergency for use by civil aircraft.

A BALLOON FOR CHELSEA.

Chelsea is to have its own balloon for seven months. Airmen are warned by an Air Ministry Notice (Navigational Warning No. 4) that this balloon will be flying from Lots Road, Chelsea, at a height not exceeding 300 feet. The balloon will only be flying between 9.00 hrs. and 18.30 hrs. It is to be used for advertising and the mooring cable will not be marked.

A NEW WEATHER CHART.

In consequence of the rapid development of the international organisation for the collection of weather reports, the Meteorological Office, London, have been able to prepare each day a chart showing the weather for the greater part of the earth's surface north of latitude 40 deg. N. The importance of this chart to everyone interested in the weather is so great that it is issued daily as part of the Daily Weather Report.

The left-hand half shows a weather chart of the British Isles with forecasts, general inference and further outlook. This page also contains the data from health resort stations. The right-hand half shows the new chart of the northern hemisphere with the North Pole slightly displaced from the centre of the sheet, thus allowing North America, Europe, North Africa, and Northern Asia to be included. The two back pages contain the complete set of observations made at the telegraphic reporting stations in the British Isles four times each day, namely, 01.00 hrs., 07.00 hrs., 13.00 hrs., and 18.00 hrs., together with a large amount of miscellaneous information and full explanation of the symbols used.

The land areas are printed in buff colour, so that they show up very clearly, and the weather information is overprinted in black. The new Daily Weather Report may be obtained from the Meteorological Office, Air Ministry, Kingsway, London, the price being 1½d. for single copies or 6s. 6d. a quarter or 25s. a year, post free.

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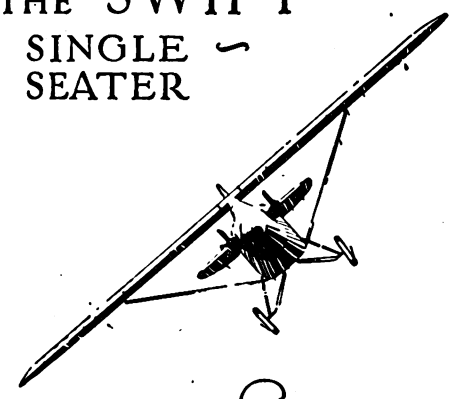

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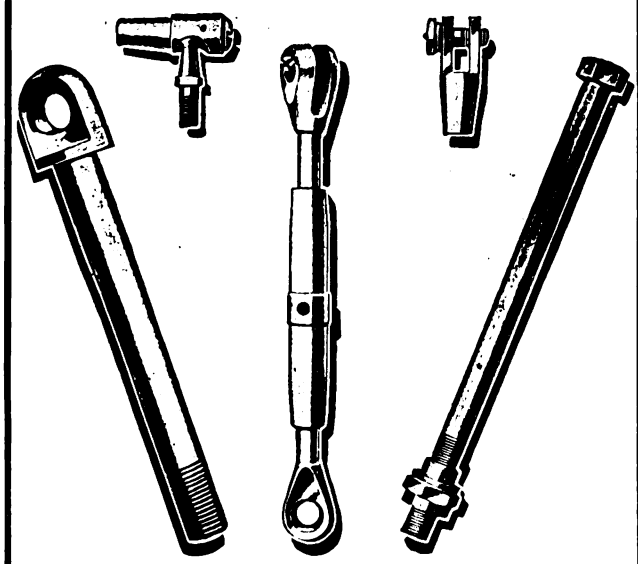

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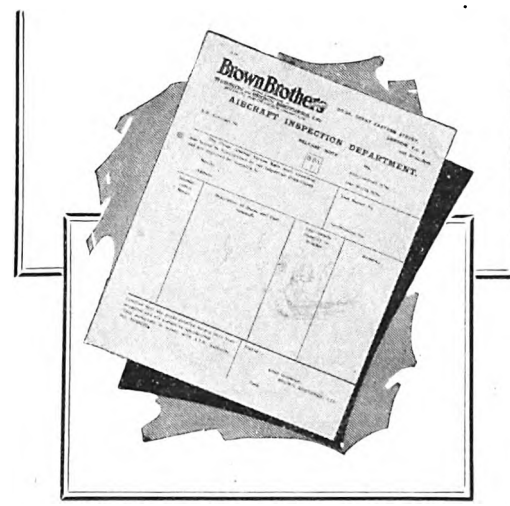

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Arnold's Chronograph with independent fly-back minutes, seconds and 1/5 seconds mechanism and a 5-year guarantee sells at £3 10s., Arnold's "Motorist's Recorder" with independent fly-back, 1/5 seconds mechanism and a 3-year guarantee is priced at 25s., and Arnold's "Greyhound" watch recorder which will time a race to 1/100th part of a second sells at 45s. Full particulars of all these watches will be supplied by the company at the above address.

NEW COMPANIES.

Scott-Moncrieff Limited.—Private company. Registered Feb. 25. Capital, £1,000 in £1 shares. Objects: To acquire the business of motor and aircraft dealers and engineering advisers and valuers, garage proprietors and motor and aviation instructors now carried on by D. W. H. Scott-Moncrieff and G. H. M. O'Farrell, at 60, Cheval Place, Brompton Road, S.W. The permanent directors are: D. W. H. Scott-Moncrieff, Bulkeley Cottage, Englefield Green, Surrey. G. H. M. O'Farrell, York House, Ashburton Road, Southsea. Qualification: £25 shares. Remuneration: £312 each per annum. Secretary: G. H. M. O'Farrell. Solicitors: Ranken Ford and Chester, 4, South Square, Gray's Inn, W.C.1. Registered office: 60, Cheval Place, Brompton Road, S.W.7.

British Aviation Insurance Group.—The British Aviation Insurance Group Limited was registered as a "private" company on Feb. 24, with a nominal capital of £100 in £1 shares. The objects are to carry on the businesses of agents and brokers of or for insurance or underwriting of aircraft, and all risks of or connected with aviation or air navigation. Power is taken to carry on business as manufacturers of and workers in metals and alloys, mechanical and electrical engineers, manufacturers and repairers of and dealers in engines, aeroplanes, seaplanes, airships and aircraft generally, motor vehicles, ships and boats. The subscribers (each with one share) are:—H. G. Simmons, 78, Cornhill, E.C.3, London Manager, Union Insurance Society of Canton Ltd. M. Evans, 36, Cornhill, E.C.3, director of C. E. Heath and Co. Ltd. The first directors (to number not less than 2 nor more than 8) are to be appointed by the subscribers. No qualification required. Remuneration: As fixed by the company. Solicitors: Stephenson Harwood and Tatham, 16, Old Broad Street, E.C.2. The registered office is at 78, 79 and 80, Cornhill, E.C.3.

British Aircraft Manufacturing Co.—The British Aircraft Manufacturing Co. Ltd. was registered as a "public" company on Feb. 26, with a nominal capital of £100 in £1 shares. The objects are to manufacture, repair, buy, sell, let on hire and turn to account aeroplanes, seaplanes, flying-boats and aircraft of all kinds, and the component parts thereof, including engines, fittings and accessories; to acquire, build and maintain hangars, sheds, aerodromes and accommodation for aerial conveyances; to establish, maintain and work lines of aerial conveyances and aircraft. The subscribers (each with one share) are: J. Barnes, 7, Walcot Gardens, Kennington, S.E.11, accountant. S. A. Sharpe, Glen Lynn, The Park, Great Bookham, accountant; and five clerks. The first directors (to number not less than 2 nor more than 7) are to be appointed by the subscribers. Solicitors: Herbert Smith and Co., 62, London Wall, E.C.2.

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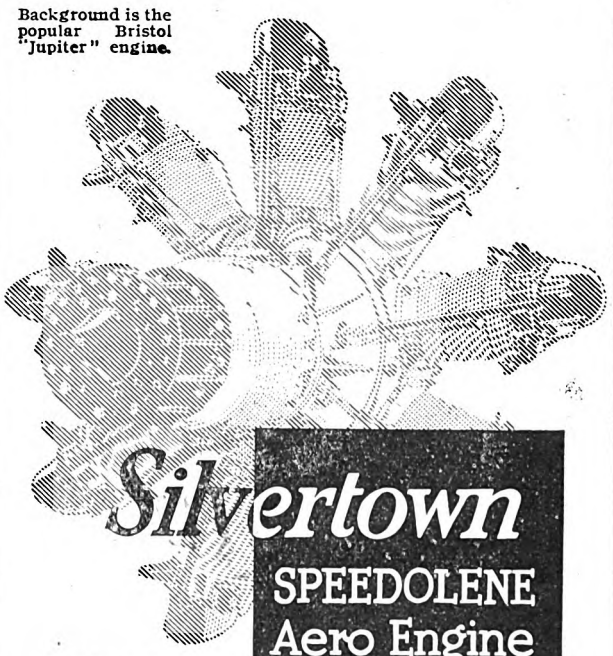

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PERSONAL NOTICES.

Death.

PRESTON.—On Feb. 24, at Hertfordshire County Hospital, from burns following a motor accident, Capt. Overton Inett Preston, M.C., Croix de Guerre (late R.A.F.), younger son of the late Martin Inett Preston, of Nottingham.

Marriages.

STANILAND—GREGORIE.—The marriage took place on Feb. 19, at St. Peter's-in-Eastgate, Lincoln, of Flt. Lt. C. S. Staniland, second son of Mrs. Staniland, of Abbey House, Louth, and Miss Evelyn Mary Gregorie, daughter of Mr. and Mrs. F. Gregorie, of Stones Place, Lincoln.

STUDD—NEW.—The marriage took place on Feb. 27, at Uffculme, Devon, of Sq. Ldr. T. Q. Studd, R.A.F., son of Mr. and Mrs. E. F. Studd, of Exeleigh, Starcross, Devon, and Miss Esther Mary New, elder daughter of Mr. and Mrs. H. H. G. New, of Craddock, Cullompton.

Forthcoming Marriages.

BRAIN—BROWNHILL.—The engagement is announced of Lester Joseph Brain, A.F.C., Brisbane manager of Quantas Ltd., son of the late Mr. A. L. B. Brain and Mrs. Brain, of Strathfield, Sydney, and Constance, only daughter of the late Mr. M. C. Brownhill and Mrs. Brownhill, of Strathfield, Sydney, N.S.W.

WALLER—LAMBE.—The engagement is announced between Sq. Ldr. W. H. de W. Waller, R.A.F., second son of the late Mr. and Mrs. Albert Waller, of Shannon Grove, Banagher, King's County, and Elisabeth Hope, daughter of the late Mr. H. E. Lambe and of Mrs. Lambe, Grove House, Semley, Shaftesbury, and step-daughter of Air Vice-Marshal C. L. Lambe.

Births.

FRY.—On Mar. 1, at Hethe House, Bicester, to Katherine Mary, wife of Flt. Lt. W. M. Fry, R.A.F.—a daughter.

PEARSON-ROGERS.—On Feb. 27, at 2, Walton Place, S.W., to Francesca, wife of H. W. Pearson-Rogers, R.A.F.—a daughter.

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Special PREPAID Rate—18 words 4/6, 3d. per word after; 13 insertions, 18 words, 4/-; 26 insertions, 18 words, 3/6; 52 insertions, 18 words, 3/-, 2d. per word after. Situations Wanted ONLY—18 words 1/-. Box No. 6d. extra.

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Air Survey Co. Ltd., 3, Grosvenor Gardens, S.W.1. (Victoria 5903.) Dum Dum, Calcutta, and Monkey Point, Rangoon.
The Aircraft Operating Co. Ltd., 8, New Square, Lincoln's Inn, London (Holborn 8131), and Bulawayo, Southern Rhodesia; Cairo, Egypt; Rio de Janeiro, South America: Contractors to the Ordnance Survey. Laboratories and Subsidiary Company for aerial photography in the British Isles. Aerofilms Ltd., Colindale Avenue, Hendon (Colindale 6183 and 6184).

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National Flying Services Ltd. (See page 404.) Go by N.F.S. 1s. a mile; 1s. 6d. two passengers.

AIRCRAFT FOR SALE.

Blackburn "Bluebird" side-by-side seating, all-metal construction. Price £795. Sole world's distributors, Auto-Auctions Limited, Burlington Gardens. Old Bond Street. London. Aerodrome: Heston.
D.H.60 X Moth Cirrus Mk. II. C. of A. to November, 1930. Recently completely overhauled for renewal of C. of A. Slots. Excellent condition. Price £440. Machine mav be seen at Midland Aero Club, Castle Bromwich.—S. P. Jackson, City Mill Inn, Cox Street, Coventry. 'Phone 3752.
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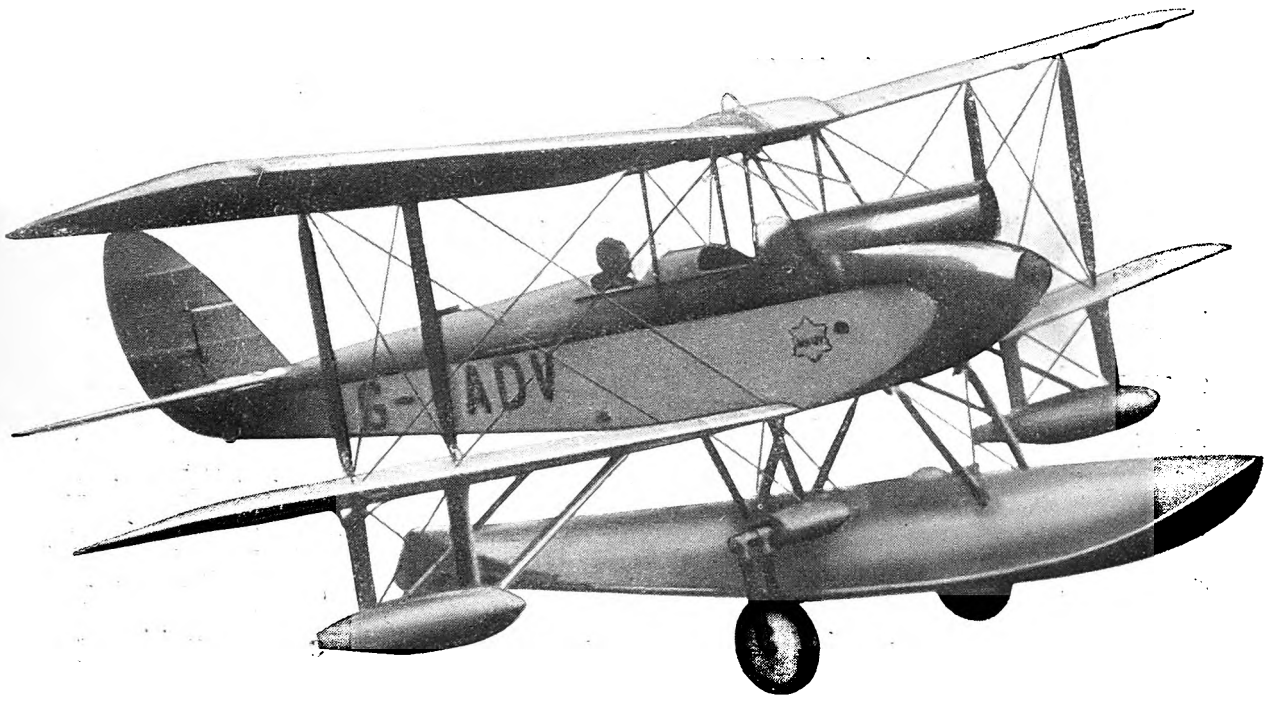

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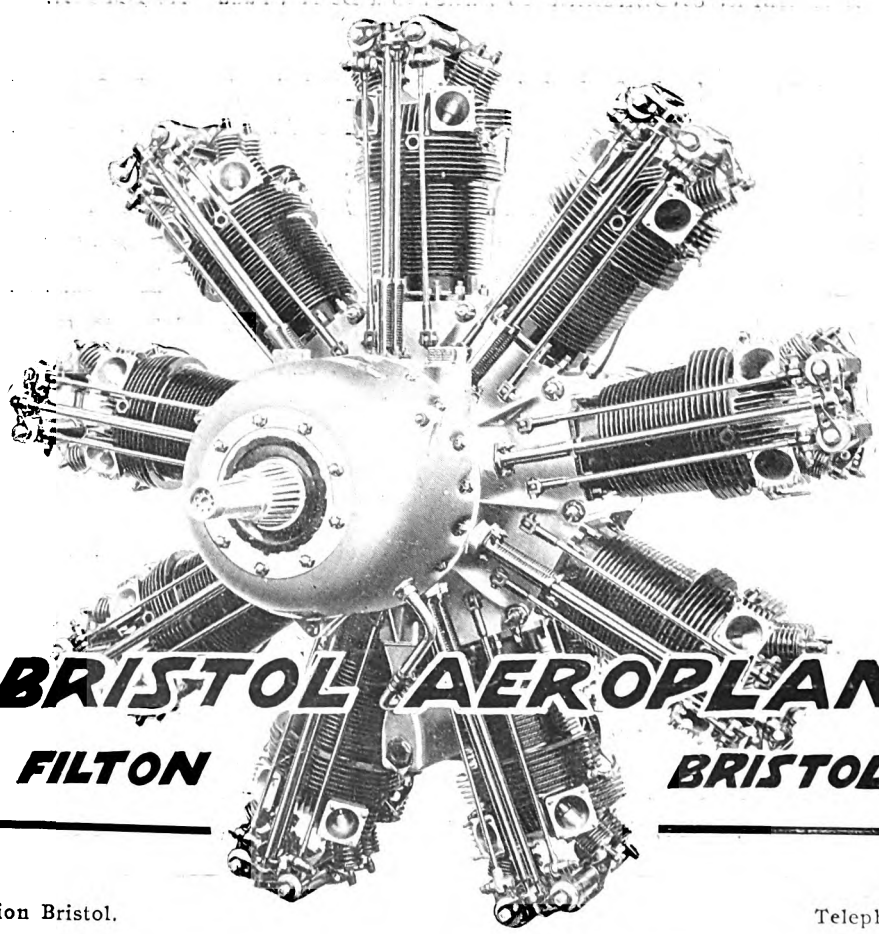

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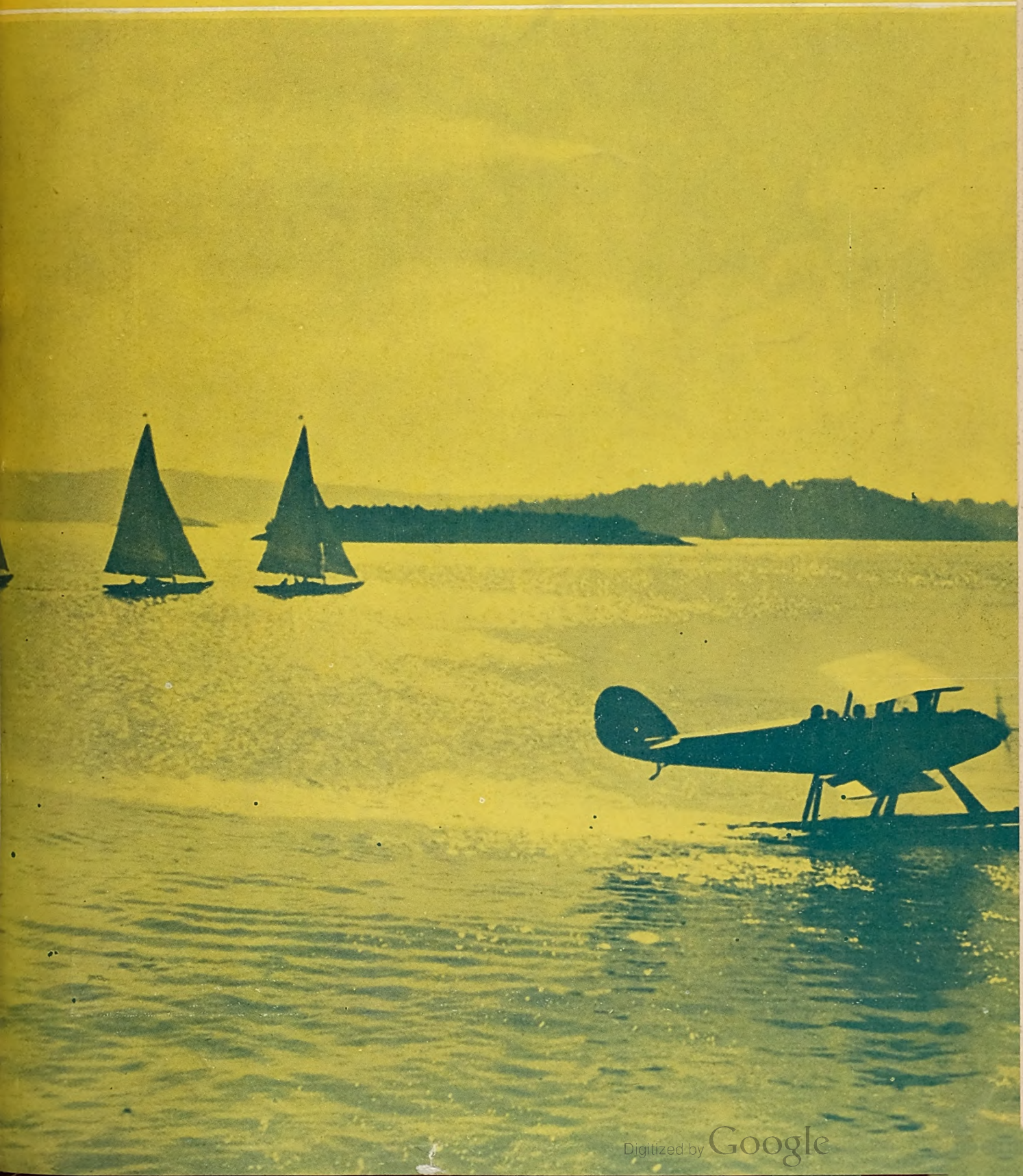
Edited by
C.G.Grey



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MARCH 12, 1930.

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ON THE AIR ESTIMATES.

The Air Estimates for the year 1930-31 were issued on March 8. The White Paper, signed by Lord Thomson as Secretary of State for Air, introducing the Estimates, gives the following table of the main features:—

	1930	1929 (including supplementary estimate).	+ or —
	£	£	£
True Gross (total of expenditure sub-heads)	21,073,800	20,013,100	+1,060,700
Deduct super-cut	150,000	—	+ 150,000
Gross Estimate	20,923,800	20,013,100	+ 910,700
Deduct Fleet Air Arm grant	1,267,000	1,067,000	+ 200,000
Deduct other Appropriations-in-aid	1,806,800	1,986,100	— 179,300
Net Estimate	17,850,000	16,960,000	+ 890,000

In this Paper Lord Thomson recalls the fact that five years ago the gross total of Air Estimates was materially higher than that now presented and that economies have enabled the figure to be reduced notwithstanding the increase in the strength and activities of the R.A.F., the renewal of its equipment, and the progress of Civil Aviation. He points out that the Estimates allow for a broad continuity of air policy but that the approved increases for the coming year are small and are designed to demonstrate once more the earnest desire of His Majesty's Government to avoid disastrous competition in air armaments.

The main feature of the 1930 programme is the consolidation of existing units of the Home Defence Force. But the only new unit added to that Force is to be one non-regular squadron. Lord Thomson adds: "We shall thus have a breathing space in which to watch the development of the new spirit which informs pacific international instruments, such as the Treaty for the Renunciation of War and the Optional Clause."

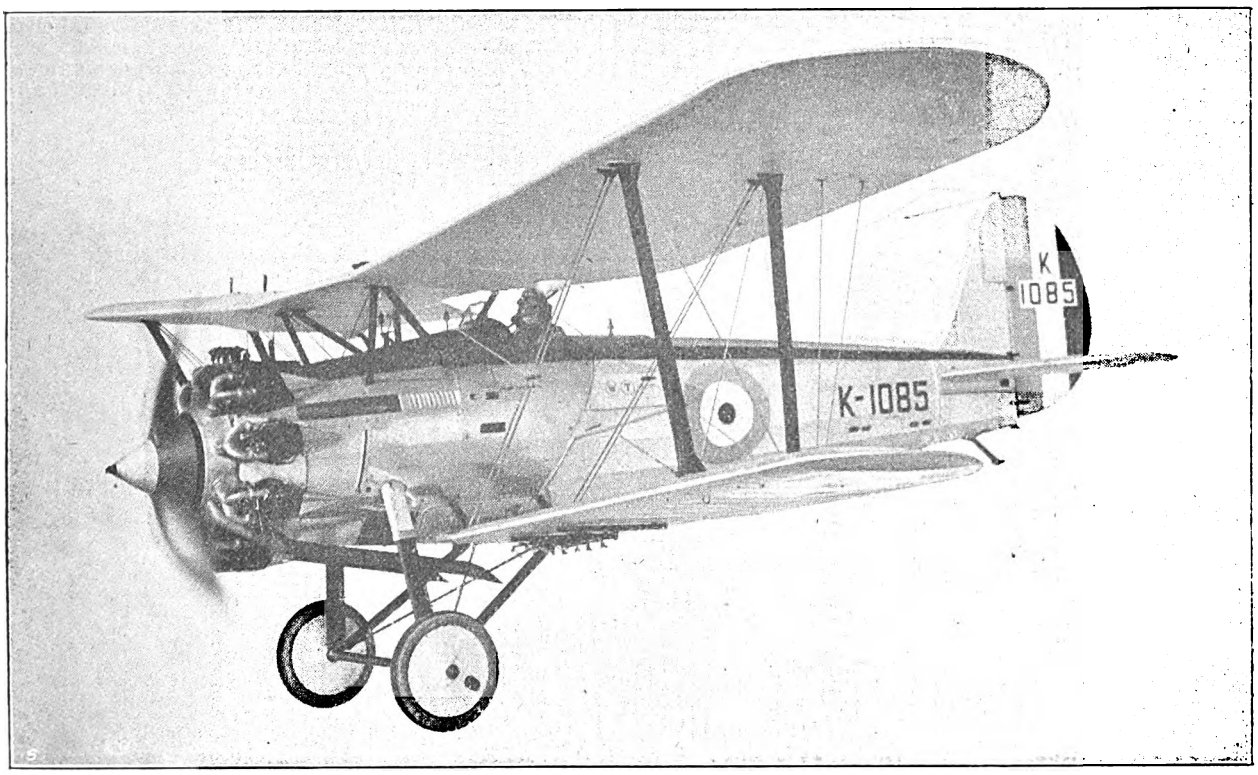
Increases in Vote 1 (Personnel), Vote 2 (Quartering), Vote 3 (Technical Material), and Vote 7 (Reserves) are consistent with this policy and are consequential on existing commitments which could not be reduced without impairing the efficiency of the R.A.F. and the safety of its personnel. The decrease in Vote 4 (Works) indicates that capital expenditure under this head is being still more modestly advanced,—which presumably means that people will still go on living in war-time huts. The increase in Vote 11 (Non-Effective) reflects the growing incidence of retirement which hitherto has been low because the R.A.F. is a new Service.

The increase in Vote 8 (Civil Aviation) is due to further proposed developments in civil air transport. The White Paper points out by way of consolation for the small amount of this total in spite of the increase that it is proportionately higher than the increase in Service Votes.

STRENGTH OF THE R.A.F.

The R.A.F. now consists of approximately 70 regular squadrons including the equivalent of 12 squadrons in the Fleet Air Arm, and 12 non-regular squadrons. During the financial year 1929-30 the formation of one regular squad-

"FOR WISDOM IS A DEFENCE, AND MONEY IS A DEFENCE: BUT THE EXCELLENCY OF KNOWLEDGE IS, THAT WISDOM GIVETH LIFE TO THEM THAT HAVE IT."—(*Ecclesiastes vii. 12.*)



DEFENCE.—A Bristol Bulldog (Jupiter) single-seat ghter for one of the Fighter Squadrons of the Air Defence of Great Britain, which are being re-equipped under the 1930-31 Estimates.—(*"Aeroplane" photograph.*)

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ron for Home Defence, one squadron of flying-boats and four cadre or auxiliary squadrons was put in hand; and a torpedo-bomber squadron, originally formed as an experimental unit, has now been organised for service duties and is to go to Singapore in the course of the current year.

In 1930 one flying-boat squadron and one cadre squadron will be formed. But the chief development will be in the equipment of the R.A.F. as a whole and of the 1929 units in particular. Two new flights which were in the Fleet Air Arm programme for 1929 and were deferred are now included in the 1930 programme.

The White Paper mentions the activities of the R.A.F. in the Middle East and in the Sudan and in Palestine.

During 1929 there has been an encouraging increase in applications for Permanent Commissions from the public schools for cadetships at Cranwell, and from the Universities for direct entry.

A new institution in 1930 is an advanced course in armament for specialist officers. Also, special training in torpedo work for officers in flying-boat and other Coast Defence squadrons is to be given by courtesy of the Admiralty.

Attention is drawn to the fact that excellent results are being achieved by the University Air Squadrons at Oxford and Cambridge and that solo flying in term time is now permitted to members of both these squadrons. There is interest in noting that applications to join these squadrons are twice as numerous as the number of vacancies.

Technical Equipment.

Vote 3 (Technical and Warlike Equipment) shows an increase of £642,000. This is caused by the equipment of units formed in 1929 and by the continued replacement of obsolescent types.

The attention which is now being given to saving life in the Air Force is shown by the fact that parachutes are now universally used except in certain obsolescent types of aircraft. Also efforts are being made to produce a parachute with a quick attachment and detachment which can be used in sea-going aircraft. Nineteen lives have been saved by parachutes during the past year.

Furthermore, forty-three regular squadrons at home and abroad, one cadre squadron and five auxiliary squadrons are to be equipped with aircraft with slotted wings by the Autumn of 1930. These represent half the types and more than half the total number of aircraft used in the R.A.F.—which is quite satisfactory for The Aeroplane, considering that slots were advocated in this paper over ten years ago, and, after being laughed at for five years, have since been steadily coming into favour.

Motor transport on the ground is being improved. Heavy obsolete lorries are being replaced by new six-wheelers (Morris).

There is interest in the statement in the White Paper that owing to the larger horse-power of the engines now used there is an increase in the consumption of petrol, but that the cost of lubricating oil is being reduced by the extended use of mineral oil, which, the White Paper points out, is considerably less expensive than castor oil.

Research.

There is an increase of £17,000 in this department because of new constructional work at the Royal Aircraft Establishment, Farnborough, but other items show decreases. The excuse for spending still more money on Farnborough is that the old buildings which were put up during the War are not economical for the smaller amount of work which is now being done. Altogether £41,500 is being provided for the reorganisation of the buildings of the R.A.E.

While admitting that an establishment of the nature of the R.A.E. is necessary and that it should be conducted economically, one still fails to see that the Nation receives anything like value for the amount which the R.A.E. costs. One can only hope that the new full-sized wind tunnel which is to be built will justify its existence better than does most of the equipment of the R.A.E.

The White Paper states that the variable-density wind tunnel at the National Physical Laboratory is expected to be finished and running during the current year.

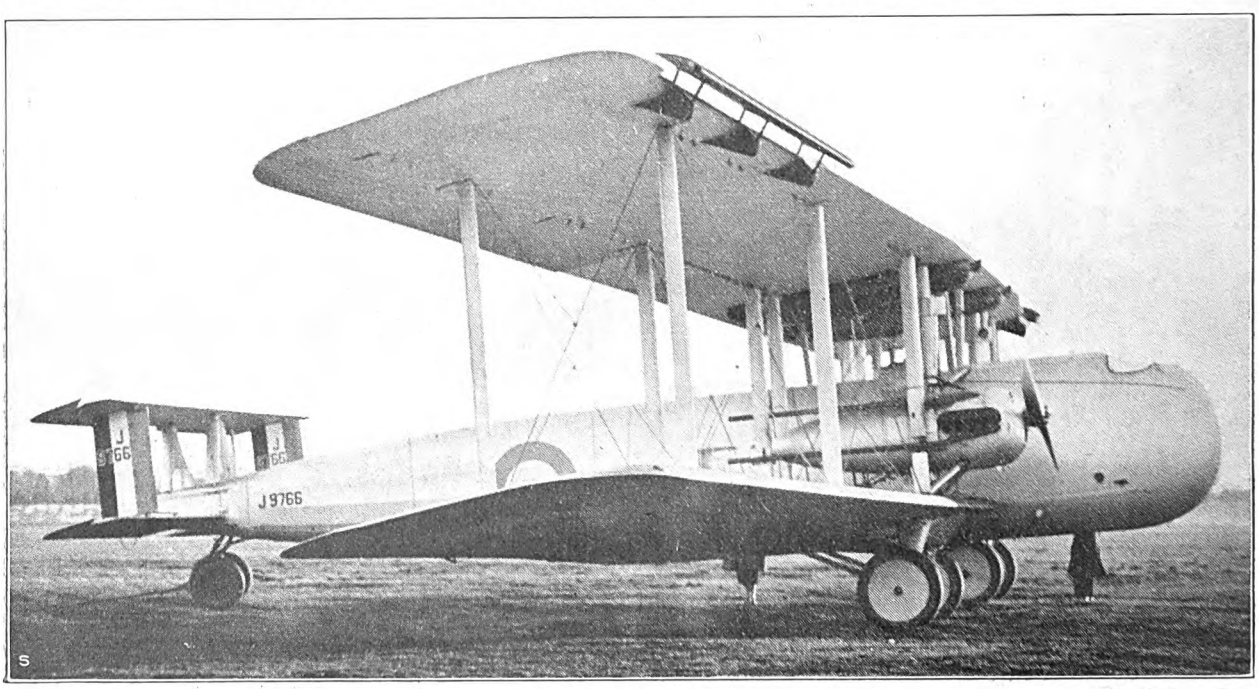
In this section the statement is made that the chief sources of noise in aircraft, namely, the engine and the tip of the airscrew at high speeds, are now being attacked, simultaneously with an investigation of the best design and materials for cabin construction from the standpoint of sound insulation. Evidently our high-class scientists have not yet turned their attention to the simplest method of abolishing noise, namely putting the engines and the airscrews in the right place.

Attention is drawn in the White Paper to the fact that the Rolls-Royce engine with which the Schneider Trophy was won developed 1,900 h.p. for a weight of 1,526 lbs. (.8 lb. per h.p.), whereas the engine of the winning machine in 1927 developed 900 h.p. for a weight of 928 lbs. (1.03 lbs. per h.p.). Here one may recall the fact that in the report of the Schneider Trophy Contest which appeared in The Aeroplane the week after the Contest the statement was made, on the authority of an American aircraft constructor, that the power of the winning Rolls-Royce was approximately 1,900 h.p. This figure has been religiously kept dark since then until it was disclosed a week or two ago by Mr. Rowledge of Rolls-Royce Ltd. in the interesting Paper which he read before the Royal Aeronautical Society. Considering that the American constructor based his calculations entirely on his estimate of the weight of the machine and on its actual performance in the Contest he deserves to be complimented on his acumen.

Airships.

Somewhat naturally, as an enthusiast for lighter-than-air craft, Lord Thomson devotes a good deal of the White Paper to the achievements of airships. He emphasises the fact that both R 100 and R 101 have proved to be very satisfactory experiments and that they are both thoroughly stable and easy to control.

Undue emphasis seems to be laid on the fact that R 101 is equipped with the first heavy-oil compression-ignition engine ever used as a power-unit in aircraft in this country. Personally one has always considered that the Air Ministry made a serious mistake in using heavy oil engines in this ship. Seeing that the ship herself was an experiment she ought to have been equipped with engines whose performance was exactly known,—and then when the ship



SAFETY.—The first Vickers Victoria (Napier Lions) with slots to be delivered to No. 216 (Bomber) Squadron, R.A.F.

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For the fifth successive year, Napier engines have been selected by the Royal Air Force for the annual service flight from Cairo to Cape Town and back.

On the 24th February the four Fairey (Napier) aircraft engaged on this year's flight arrived back at Cairo, having covered 52,000 engine miles without mechanical trouble and according to schedule.

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herself had ceased to be an experiment she might have been re-equipped with experimental engines. As it is, the ship cannot possibly have a fair chance of showing herself at her best.

Also the old argument is used that R 100 is unfit for use in a tropical climate because she uses petrol instead of heavy oil. Considering that during the War 1914-18 a Zeppelin starting from Bulgaria went all the way across the Equator to German South-West Africa and back, and that during and since the War airships have continually operated in temperatures at least as high as anything that is likely to be met between England and India, the objection seems futile. If the Air Ministry really wants to impress India with the possibilities of airships why not send R 100 and pick a reasonable time of the year to do it?

The only possible reason for wanting to send R 101 in preference must be that R 101 is a Government-built ship which was laid down under the ægis of a socialistically-inclined Government and may therefore be supposed to appeal to that party in India which is agitating for self-government or swaraj, or whatever it likes to call itself, whereas R 100 being built as a private speculation by capitalists might not be popular.

In this section of the White Paper reference is made to a mechanical means of moving large airships into and out of their sheds. This mechanism apparently consists of a short mooring-mast mounted on a long-sided triangular base carried on caterpillar tractors. This apparatus is to tow the ship into position between two parallel railway tracks which will run into the shed. When the ship has been manœuvred into position she is to be attached to trucks on the rails and thus will be towed into the shed.

A rail tractor arrangement was used for the German airships at several of their big airship stations during the War 1914-18,—and seemingly it worked quite satisfactorily except in very high winds blowing broadside to the sheds. So far as one remembers the German railways ran out fan-wise from the sheds so that the ship could be brought to the rail in almost any direction of the wind and the actual rail cars got round the curves like the bogie trucks of a long railway coach, so there was no need for the mooring mast and caterpillars in addition to the rails.

Works.

There is at total decrease of £109,000 in Works and Buildings.

An interesting point here is that pending negotiations with Egypt only indispensable work outside the Canal Zone is being done. On the other hand, additions are being made to the accommodation for the squadron in the Sudan. And certain emergency work is being done in Palestine. These are to be paid for out of the Colonial and Middle East Votes.

The only new stations on which work is to be begun are one in East Anglia for regular squadrons, one for a non-regular unit in Northumberland and one for a non-regular unit in Scotland. The last named is intended to replace an unsuitable temporary station.

Civil Aviation.

There is a net increase of £89,000 in the expenditure on Civil Aviation. Of this £60,000 is an additional payment to Imperial Airways Ltd. for starting the air service to South Africa. The Air Ministry expect this to be running as far as Tanganyika by the Autumn of 1930 and to get through to Cape Town in the Spring of 1931.

Lord Thomson announces definitely that when the existing agreement with Light Aeroplane Clubs ends in the course of this year further financial assistance will be given to the Clubs on precisely the same scale as that given to National Flying Services Ltd. The amount for all payments in 1930-31 to Clubs and N.F.S. Ltd. is estimated at £20,000.

This is rather interesting, because N.F.S. Ltd. think that they can get along perfectly well on their subsidy, whereas all the Clubs say that flying cannot be done at the rate of subsidy accepted by N.F.S. Ltd. So we shall see what we shall see.

Meteorology.

There is a well-deserved increase of £11,500 for expenditure on meteorology. From being rather a poor joke before the War, our Meteorological Department has now become one of the most efficient and valuable of our Government services. Aviators, both Service and civil, have recognised the value of the department and its efficiency for many years, and during the last two or three years the uses of widespread and accurate meteorological information has actually penetrated to the Marine Mind and the Agricultural Mind, so that there are constant calls on the Meteorological Department from shipping people and farmers. To have penetrated two such communities is indeed a triumph for the department.

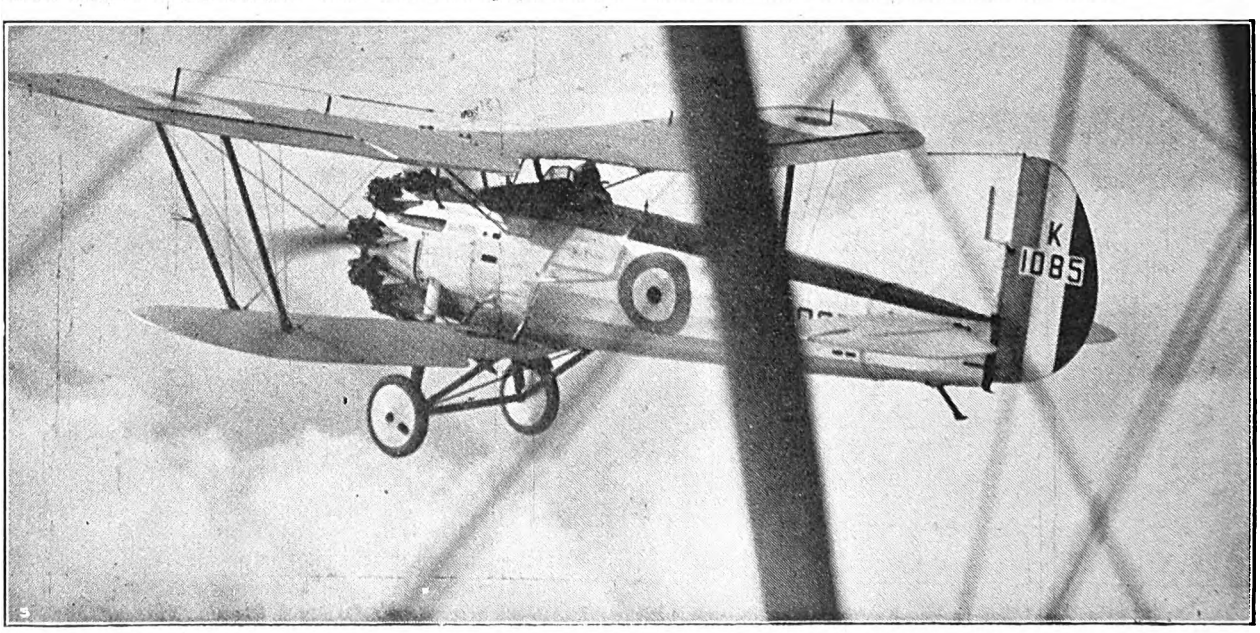
The White Paper states that there is an ever increasing demand for the services of trained meteorologists and that there is no available source of supply outside the Government service. Consequently six posts have been added to the junior grade where men who have had university courses in physics or mathematics will receive systematic training in meteorology. These junior officials will constitute a small reserve from which officers can be drawn to carry on responsible work arising from new developments.

In this connection the fact emerges that 500 vessels, mostly based on the Port of London, are voluntary observation ships which while at sea keep in touch with the Meteorological Office and so increase the scope of the weather charts prepared at the Air Ministry. To deal with these observing ships the Air Ministry has had to establish a Port Meteorological Office in the London Docks.

A Deserved Tribute.

Lord Thomson ends the White paper with the following commendable paragraph:—

> The retirement from the post of Chief of the Air Staff, on the 1st January last, of Marshal of the Royal Air Force Lord Trenchard marks the conclusion of twelve years of independent existence of the Force. Since 1912, when he joined the then Royal Flying Corps, Lord Trenchard has devoted himself to the Air Service with a single-mindedness of purpose which deserves, and has received, the recognition not only of the Force which he has brought to so high a pitch of efficiency, and of the successive Governments which he has so loyally served, but of the country as a whole. The Royal Air Force will always remember the inspiration and guidance which it received from him during the difficulties of its early years.



CLEAN HEELS.—A Bristol Bulldog (Jupiter) passing an observation aircraft.—(*"Aeroplane" photograph.*)

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THE FAIREY III.F. TYPE AIRCRAFT
(fitted with Napier "Lion X1" engine)

AGAIN SUCCESSFUL

Outstanding merit has undoubtedly been achieved by the successful conclusion of the Annual Cairo-Cape-Cairo flight undertaken by the Royal Air Force.

The four Fairey III.F. Aircraft reached Heliopolis on the 24th February, 1930, after having covered an aggregate mileage of 52,000 miles, carried out exactly to a pre-arranged time schedule and without mishap.

Even more meritorious is the fact that this is the fifth year in succession that this flight has been undertaken with complete success by Royal Air Force Units equipped with Fairey Aircraft.

FOUR AIRCRAFT
AN AGGREGATE OF
52,000
MILES
FLOWN TO SCHEDULE.

FAIREY AIRCRAFT

THE FAIREY AVIATION CO. LTD.
HEAD OFFICE AND WORKS :: :: :: HAYES, MIDDLESEX
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HIGH PERFORMANCE SERVICE AIRCRAFT

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THE ESTIMATES.

Hereunder appears the official statement of expenditure in 1928 side by side with the Air Estimates for 1929-30, and 1930-31.

Financial Year.	1928.	1929. (Estimate, including Supplementary Estimate.)	1930. (Estimate)
Vote A.—Numbers	(a) 28,888	(a) 32,000	(a) 32,000
	£	£	£
Vote 1.—Pay &c. of the Air Force ...	3,530,219	3,589,000	3,731,000
Vote 2.—Quartering Stores (except Technical) Supplies and Transport	1,651,116	1,676,000	1,735,000
Vote 3.—Technical and Warlike Stores (including Experimental and Research Services) ...	6,402,616	6,954,000	7,596,000
Vote 4.—Works, Buildings and Lands	1,756,005	1,864,000	1,720,000
Vote 5.—Medical Services	292,060	306,000	298,000
Vote 6.—Educational Services	505,789	498,000	493,000
Vote 7.—Auxiliary and Reserve Forces	533,863	556,000	591,000
Vote 8.—Civil Aviation	353,764	411,000	500,000
Vote 9.—Meteorological and Miscellaneous Effective Services	219,494	228 000	245,000
Vote 10.—Air Ministry	650,738	661,000	675,000
Vote 11.—Half-Pay, Pensions and other Non-Effective Services ...	194,506	217,000	266,000
Balances Irrecoverable and Claims Abandoned	1,765	—	—
Net Cash Expenditure	16,091,935	16,960,000	17,850,000

Note—The figures for expenditure represent the Net Expenditure after taking into account receipts noted in the Air Appropriation Account as receipts in excess of estimated Appropriations-in-Aid.

(a) Includes Army personnel attached to the Royal Air Force but excludes Royal Air Force personnel serving on the Indian Establishment, those in receipt of pay from non-effective Votes only, and those lent to Dominion, Colonial and Foreign Governments.

THE INDIVIDUAL VOTES.

Vote 1 (Pay of the R.A.F.) discloses that there are to be four Air Commodores more in 1930 than there were in 1929, one more Group Captain, two less Wing Commanders and twenty-three more Squadron Leaders in the General Duties Branch. Provision is also made for ten extra Warrant Officers and thirty-five extra airmen pilots.

Vote 2 (Quartering and Stores, other than Technical Stores) shows a net increase of £59,000 and calls for no immediate comment.

The Livelihood of the Aircraft Trade.

Vote 3 (Technical and Warlike Stores) is always that which interests the Aircraft Industry most, because it provides the money out of which we all still make our living and must continue to make our living until we develop civil air transport as a business proposition.

The Trade will be happy to know that there is an increase of £561,000 for Aeroplanes, Seaplanes, Engines, and Spares.

The next biggest increases are: £91,000 for Mechanical Transport; £82,000 for Airship Development; £80,000 for Armament and Ammunition; £52,000 for Experimental and Research Establishments; £37,000 for Miscellaneous Research and Development; £33,000 for Aircraft Technical and Warlike Stores; £21,000 for Miscellaneous Materials; £16,000 for Petrol and Oil; £13,000 for Inspection Services, and £6,000 for Electrical Stores.

The total sum to be spent on aeroplanes, seaplanes, engines and spares is £6,640,000. Of this £3,624,000 is for complete machines,—an increase of nearly half a million pounds.

Complete engines total £1,946,000, an increase of about £70,000.

Spares, parachutes and miscellaneous come to £670,000, a decrease of £30,000. As there is an increase in the expenditure on parachutes the decrease on general spares must be considerable. This is due to the increased reliability of engines and aircraft, and to improvement in piloting, which together reduce the number of accidents and consequently the amount of spares needed.

Curiously enough engine spares alone amount to £400,000 and show an increase of £30,000. This is probably because of the steadily increasing amount of flying which is done year by year, and because the Air Force does so much reconditioning and overhauling of engines itself.

The R.A.E.

Section B, Experimental and Research Establishments, is interesting. The total is £165,000. Published figures show that the total expenditure on the R.A.E. Farnborough is estimated at £454,000 for 1930 as against £396,000 in 1929.

From this is deducted £358,000 which is the money paid under Vote 3 to the R.A.E. under Sections A (Aeroplanes, Seaplane, Engines, etc.); Section D (Aircraft Technical and Warlike Stores); Section E (Armament and Ammunition); Section F (Electrical Stores); Section G (Miscellaneous Research and Development), and Section J (Balloons and Hangars). That is to say, Vote 3 pays Farnborough £454,000 in the form of wages and material, and buys from it £358,000 worth (alleged) of manufactured materials. And so the total cost of the R.A.E. is set down as the difference between the two, namely, £96,000.

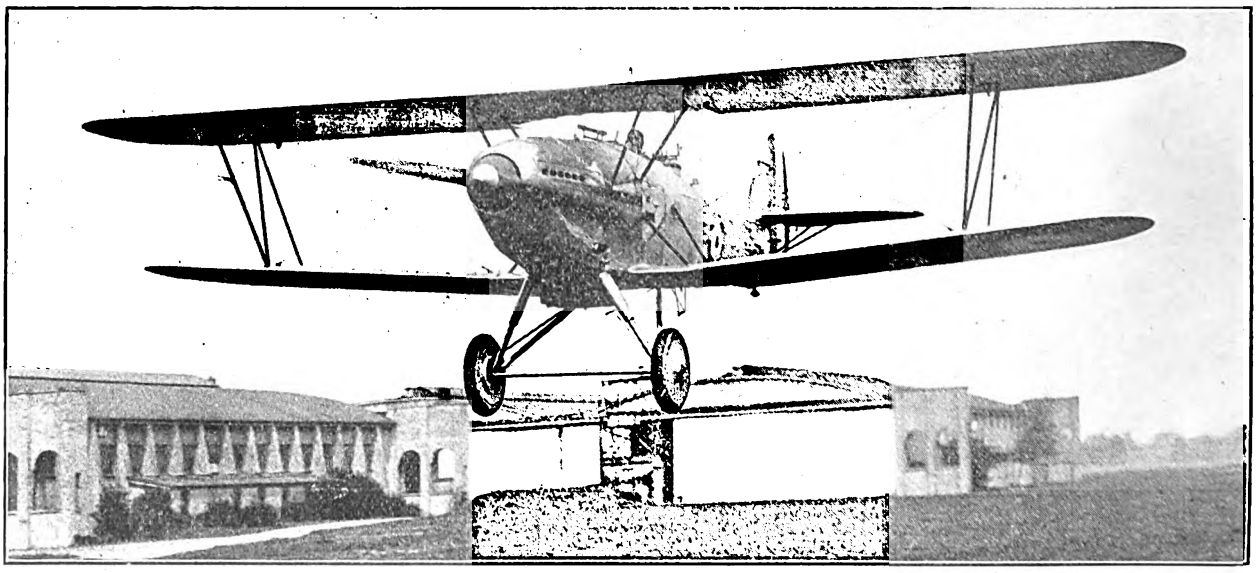
One can imagine an experimental engineering works run as a commercial concern producing a good deal more for £454,000 than is produced at Farnborough, and one very much doubts whether the knowledge gained at Farnborough is worth the £96,000 which it costs even if the material produced is worth the money paid for it.

Incidentally, readers should note that the Airworthiness Department and Technical Publications Department at Farnborough, which have a staff of 85 people, are not included in the R.A.E. costs but run to about £31,000 outside of the R.A.E. altogether. That money is quite well spent, for the Airworthiness Department is one of the most valuable assets of British Civil Aviation, and the Technical Publications are extremely well done, although so many of them have to deal with utterly nonsensical experiments made at the R.A.E.

The civil staffs at Martlesham, Felixstowe, South Kensington, Gosport, Woolwich, Calshot, etc., also come into this Vote, so we can reckon that at least £70,000 of the £165,000 is quite well spent.

Inspection.

Vote C (Inspection Services) shows an increase of £13,000. This is certainly well-spent money, for our Inspection Services are the finest in the World and are the guarantee of British quality in every country. Happily the Aeronautical Inspection Department in these days works on most amic-



"AS PANTS THE HART FOR COOLING STREAMS."—The Hawker Hart (Rolls-Royce "F" water-cooled engine),—claimed to be the fastest two-seater in the World, as well as the best-protected and most comfortable for the gunner-observer.—(*"Aeroplane" photograph.*)

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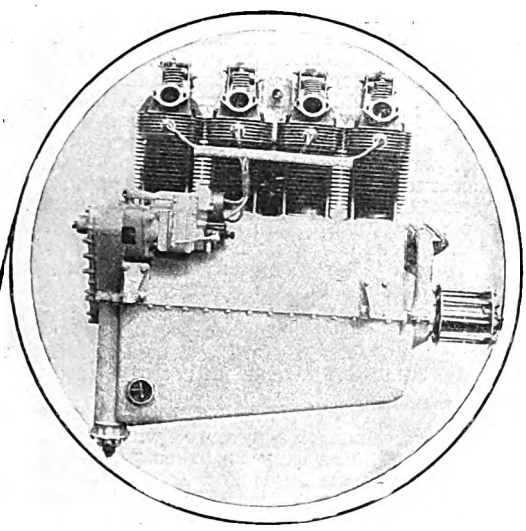

CIRRUS AND HERMES FOR POWER AND RELIABILITY

CIRRUS engines took Sqdn. Ldr. Hinkler to AUSTRALIA
CIRRUS „ „ The Hon. Lady Bailey, D.B.E. round AFRICA
CIRRUS „ „ Lieut. Bentley to and from S. AFRICA
CIRRUS „ „ Mr. Wen Lin Tchen to CHINA
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and have been used in all the great pioneer flights by light aircraft.

A three seater aircraft designed and constructed in Australia; 105/115 h.p. Cirrus HERMES engine.

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able terms with the Aircraft Trade, and the resident A.I.D. officer is regarded almost everywhere as a kind of free consulting engineer. Colonel Outram and his chief assistants deserve the Nation's thanks for the work they have done and are doing.

Under Section G (Miscellaneous Research and Development) we find that the Air Ministry makes a grant of £35,000 to the National Physical Laboratory for aeronautical research. This is also money well spent, for the N.P.L. has done quite a lot of valuable work for aviation.

The only decrease in Vote 3 is in Section J, Balloons and Hangars, which have been cut down from £18,000 to £13,000. This is rather sad, because there is quite a lot of good work still to be done by balloons. One imagines that in the next war, if sea work comes into it at all, kite-balloons will still be the cheapest and most effective air escort for sea-going transport against submarine work.

A Contradiction.

Section L (Petrol and Oil) flatly contradicts a statement in the White Paper. In it the figures show an estimated expenditure of £580,000 on petrol, which is the same as for 1929, and a sum of £50,000 for lubricants as against £34,000 in 1929, an increase of £16,000, instead of the decrease mentioned in the White Paper.

Incidentally one came across quite an interesting fact the other day, namely, that the consumption of petrol by the London General Omnibus Company alone is greater than the total consumption of aviation petrol by all the air forces and all the civil aviation in the World. Unfortunately although the statement is quite authentic one is not allowed to quote one's authority.

Vote M (Rewards to Inventors and Miscellaneous Claims) is reduced from £140,000 in 1929 to £30,000 in 1930. Evidently the Air Ministry neither expects nor anticipates the arrival of another Dunlop, Wright or Handley Page in connection with aviation,—at any rate this year or next.

Section N (Airships, Purchase of) is reduced from £92,000 to £12,000. Obviously we are not buying many airships for £12,000.

This sum is in fact provided to pay for progress in design work, presumably so as to avoid dispersing the extremely able staff of the Airship Guarantee Co. Ltd. at Howden. One happens to know that this staff has actually in hand designs which would produce a ship vastly superior to either R 100 or R 101 and the dispersal of such a staff to other occupations would be a national calamity.

Vote O (Airship Development) is reduced by approximately £1,800 by the simple process of doing away with the Deputy Director, who is also Officer in Charge of Planning, and a Flying Officer (Kite Balloons) at the Royal Airship Works at Cardington.

Inside Information.

Quite a lot of knowledge is to be gained from studying Vote 4 (Works and Buildings).

The new station at Abingdon is progressing slowly. About £30,000 has been spent on it, and about £65,000 is to be spent in 1930 out of a total of about £350,000.

Quarters for single officers at Andover are to absorb £3,000 this year and that will complete the £18,000 worth of work to be done on them.

£10,000 is to be spent out of £348,000 on the new station at Beck Row.

The small balance of £1,500 to be spent this year will finish up the £217,000 allotted to the new station at Bicester.

£51,000 is to be spent this year towards reconstructing Biggin Hill and £70,000 is to be spent at Boscombe Down, which will be nearly finished.

At Castle Bromwich £10,000 is to be spent on making the accommodation for the Auxiliary Air Force there still more luxurious.

At Cranwell £30,000 is to be spent on the new Cadet College, leaving £246,550 still to be spent on it.

An interesting statement is that £2,600 altogether is to be spent on Air Defence Experimental Works Services at Dungeness and there is an explanatory note that this is the Air Ministry's share with the War Office. Dungeness is practically Lydd, after which lyddite was named, so evidently some dark and deadly secret is hidden in this Vote.

At Eastchurch £3,000 is to be spent on additional quarters for married airmen, and a similar sum is to be spent at Farnborough on this entirely praiseworthy object. But against this £4,000 is to be spent on headquarters offices for Felixstowe, and from what one knows of Felixstowe everybody is perfectly well able to carry on, so far as office work is concerned, in the old War-time premises.

At Gosport £65,000 is to be spent in 1930 out of £282,000 allocated to reconstructing the station, leaving £68,000 still to be spent. Presumably this is being done so as to give a good impression to Naval officers who are stationed there while training for the Fleet Air Arm.

At Thornaby £30,000 is being spent this year out of £87,000 on accommodation for an Auxiliary Squadron.

The station at Upper Heyford will be finished this year at a cost of £391,000. The expenditure of £2,000 will make up the amount.

The last item on the Home Establishment reveals the fact that the new variable-pressure wind-tunnel at the National Physical Laboratory is to cost £73,250. £37,000 has already been spent on it and £27,000 is to be spent this year, leaving £9,250 still to be spent. This strikes one as a colossal expenditure for the job. No doubt the results achieved will be worth the money spent, but one is fairly certain that the same results could be achieved in a plant costing about a quarter as much.

Expenditure Overseas seems to be surprisingly low. £25,000 out of £105,000 is to be spent on reconstructing the station at Ismailia and £28,000 is to be spent in Palestine on various stations for emergency services for Army Troops, which looks as if more trouble was expected from that area.

The only really big item of expenditure Overseas is another £100,000 out of the £576,000 allotted for the construction of the air station at Singapore. Out of this amount there is only £167,000 still to be spent, so the station must by now be taking shape. Certain small items of interest are £30,000 for improved accommodation and £15,000 for improved water supply at Aden, £20,000 for accommodation at Khartum and £12,000 for a permanent shed at Kai-Tak, Hong Kong

Auxiliary Services.

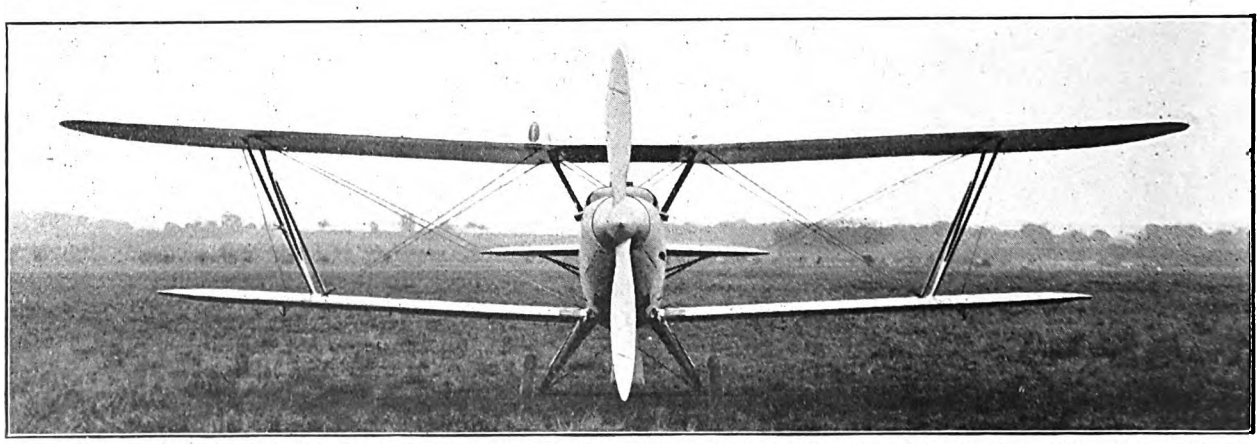
Vote 5 (Medical Services).—Evidently little change is expected in the Medical Services. Provision is made for three new Wing Commanders and that is about all.

Vote 6 (Educational Services).—Shows a decrease of £5,000. There is a decrease of £20,400 in pay for the staff at Manston and an increase of £5,500 for the staff at Halton.

Taking it all round we spend far too little on the education of the Air Force. We start by getting together an exceptionally intelligent personnel, and we could very well afford to spend considerably more money in educating those people so that on leaving the Air Force they would be a still greater asset to the nation.

Not only do we want more teachers of every sort but we want men of even higher qualifications than those at present employed. There is however some consolation in the fact that there is an increase of £3,000 in the section for General and Vocational Training which does so much towards fitting officers and men for jobs in civil life.

Vote 7 (Auxiliary and Reserve Forces).—Shows an increase of £35,000. There is a decrease of £10,600 in Reserve pay and an increase of £6,000 in payment to civil companies for training courses for the R.A.F. Reserve.



ROLLS-ROYCE ENGINED.—The Fairey Fox day bomber with a Rolls-Royce "F" engine. This view shows the remarkably small frontal area of this engine. This machine is also claimed to be the fastest of its class.
—("Aeroplane" photograph.)

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Pay and allowances of regular staff for the Auxiliary Air Force show an increase of £12,700 and grants to County Associations show an increase of £14,800.

CIVIL AVIATION.

Vote 8.—Civil Aviation shows an increase of £89,000. This is made up by an increase of £8,000 on Air Routes and Surveys, £10,000 on Technical Experiment, £7,000 on Works and Buildings, and £88,000 in Civil Aviation Subsidies.

Of the total amount subsidies to Air Transport Services, of which Imperial Airways is the only one, account for £420,000. Subsidies to Light Aeroplane Clubs amount to £15,000 as against £18,000 last year, and National Flying Services Ltd. amounts to £5,000 as against £500 last year.

There is interest in noting that rentals, housing and landing fees at Croydon are estimated to produce £22,000 and that Lympne contributes £900.

Vote 9 (Meteorological Services).—Shows an increase of £11,500, £7,000 of which is for salaries of the increased staff.

The fact that £13,700 are spent by the Meteorological Department on telegraphic, telephonic and miscellaneous charges give some idea of the amount of work done.

Among the Miscellaneous Effective Services under this vote is £1,500 for payment to the War Office in respect of prison services, so evidently R.A.F. prisoners are few and cheap. But one is glad that this is considered an Effective Service.

Vote 10 (The Air Ministry), which costs £678,000, shows an increase of £14,000. Most of this is made up of increased salaries, either through normal increase of pay due to seniority, or necessary increase of staff. There is nothing under this vote which calls for special comment.

Vote 11 (Half-pay, Pensions and other Non-Effective Services).—Amounting to £266,000, shows an increase of £49,000. £45,000 of this is an increase in retired pay and gratuities. Here again nothing calls for special comment.

THE ESTIMATES BOOK.

Those who wish to make a thorough study of the R.A.F., for example parents of boys who are thinking of entering the Air Force either as officers or airmen, will find a great deal of interest in the Air Estimates. Apart from the bare figures given officially there are, inter-leaved with the Estimates, pages of explanatory notes which are extremely illuminating. The whole volume includes 233 pages and costs 4s. (post free 4s. 3d. from THE AEROPLANE Book Department, Cannon House, Pilgrim Street, E.C.4).

By studying the book in detail anybody can get a very clear idea of the immense complication which is necessary to run a fighting service, leaving out the minor details of Civil Aviation and so forth. Those who have been interested by the recent article "On How to Get into Aviation" will find in the Air Estimates a lot of curious occupations within the Air Force itself, as for example that of driver of a steam-winch, who has a daily bonus of 3d. on top of his pay.

Taking them all round there is very little fault to be found with this year's Estimates, though naturally everybody would have been more pleased with a greater increase in the size of the Air Force and with more rapid progress in its equipment with modern aircraft. Still the fact remains that we have a very much more powerful air force than has any other nation.

Although on paper we may have a smaller number of what are optimistically called first-line machines, and may have fewer pilots, the Royal Air Force is quite able to take on any other Air Force in a majority of two to one on sheer superiority of ability as pilots and superior quality of material.

Also, though some of our aircraft are admittedly out of date, we have new machines actually in existence which are far in front of those of any foreign nation. And these are designed to be put into production at short notice.

On the Civil Aviation side we are behind-hand in that our external air-lines are not as extensive or as comprehensive as are those of France and Germany, and our internal aviation is not as active as that of the United States. Nevertheless our Civil Aviation is making quite considerable progress and we have considerably more civil aviators in this country than has any other country except the United States.

Therefore taking our aviation all round we may consider our position satisfactory. But we must remember that if we are to hold the same position in the air that we hold at sea we must make more rapid progress in the future than we have done in the past.—C. G. G.

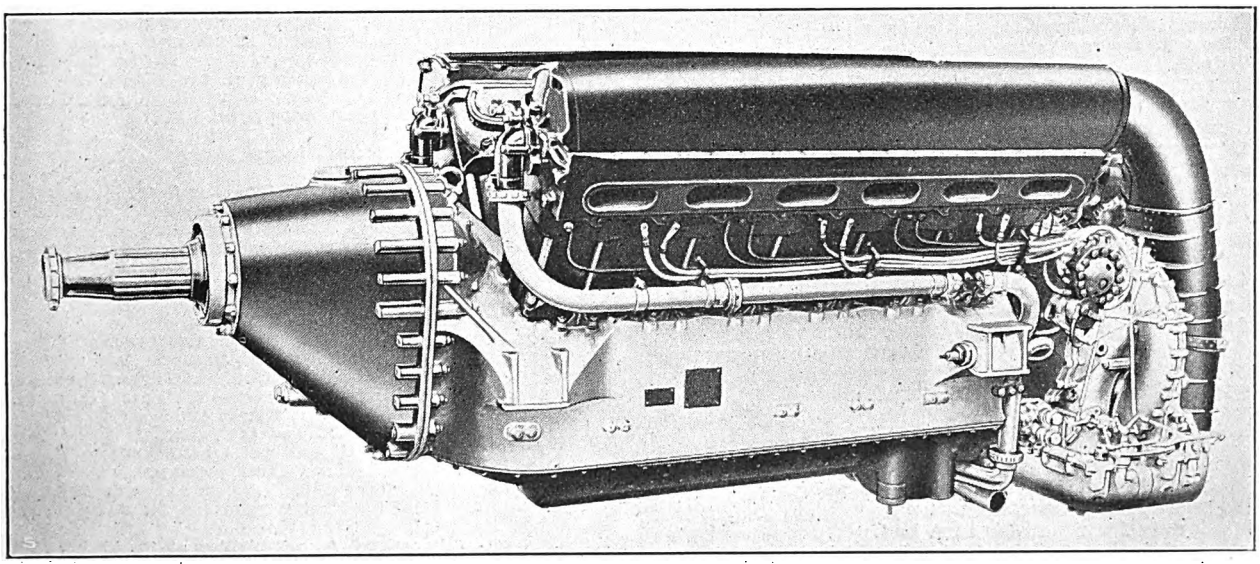
ON THE AIRCRAFT TRADE AND SOUTH AMERICA.

In view of the immense possibilities of business in South America there is much interest in learning that the Society of British Aircraft Constructors is considering seriously the problems of putting up an adequately representative show of British aircraft at the British Empire Exhibition which is being organised for next year at Buenos Aires.

Naturally the cost of a thoroughly representative exhibit which would demonstrate conclusively to all South American nations the superlative excellence of British aircraft and British aero-engines of all types would be immense. The fine work which has been done by Fairey seaplanes in Argentina and by Fairey land machines in Chile, and by De Havilland Moths as training machines with the Chilean Army, and by Vickers training machines and fighters on the 13,000-foot aerodrome at La Paz, Bolivia, besides the consistent good flying by privately owned Moths in Argentina and Brazil, has demonstrated already how good British aircraft are. But if we are to prove our superiority in all classes of aircraft against the consistent flying of French, German and American mail machines and passenger machines up and down both coasts of South America and right into the interior, we must show not only our latest fighting machines but also our new and vastly improved passenger and mail machines which will be making their first public flights in the course of the next month or two.

Consequently the S.B.A.C. has much justification in proposing to the Air Ministry and to the Admiralty that the Government should send out one of our aircraft carriers to give demonstrations at Buenos Aires of what British fighting machines can do in the hands of R.A.F. pilots, and that spare space in the carrier should be used for the transport to the Buenos Aires Exhibition of other aircraft besides those which are usually part of the equipment of our aircraft carriers.

The proposition is reasonable, because there is precedent



THE WORLD'S FASTEST.—The Rolls-Royce "R" engine (1,900 h.p.) which won the Schneider Trophy and holds the World's Speed Record at 357.7 m.p.h.

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for it. For centuries the British shipbuilding industry has been advertised all over the World by friendly visits of British warships to foreign ports. Since steam has been used for the propulsion of warships such tours, commonly called "Showing the Flag," have been a recognised form of advertisement for the shipbuilding industry.

Within the past few years the R.A.F. has made similar journeys to show the Flag, notably the famous tour of the Far East by four Supermarine flying-boats with Napier engines, and a tour of the Baltic by an assortment of flying-boats, and a trip during this last Summer to Norway by a single Southampton boat. Also, there has been the historic flight in a Blackburn Iris (Rolls-Royce Condors) from England to India and back by Sir Philip Sassoon as Under-Secretary of State for Air. And there have been the regular Cairo to the Cape and back, and Cairo to Kano and back, flights by R.A.F. units.

So far we have not had a Flag-showing tour by the Fleet Air Arm as represented by an aircraft carrier. But the aforementioned precedents of the Navy and of the Air Force should be enough to justify a similar trip by an aircraft carrier.

After all, our aircraft carriers must be somewhere. They are not always engaged in Fleet manœuvres, and officers and men have to be paid and fed; and pilots and machines have to be exercised. And they would cost no more at Buenos Aires than at Malta or Plymouth.

Actually, the only extra cost to the Government would be roughly the cost of about fifteen days' steaming at economic speed. Assuming that the ship would take about 21 days to go to Buenos Aires and another 21 days to come back the 15 days mentioned would represent about the difference between the steaming she would actually do and the steaming that she would probably do in the ordinary course of taking the ship out at intervals during that time for deck-flying exercises.

The transport of aircraft exhibits would cost nothing, except what the firms would spend in packing their aircraft for transport and taking them down to the appointed port for shipment on the aircraft carrier, and setting them up in the Exhibition or at the Aerodrome.

The whole proposition strikes one as being eminently praiseworthy and reasonable. It will cost the Government nothing, and yet it will have the effect of quite a handsome subsidy to the Aircraft Industry, if one takes into consideration the thousands of pounds that will be saved by this costless transport. Furthermore, the presence of one of our aircraft carriers and of some hundreds of members of the R.A.F. in Buenos Aires at intervals during the exhibition will have an immense effect by increasing the prestige not only of British aircraft but of the British Empire as such.—C. G. G.

THE RED ARMY AND A WORLD WAR.

The following notes appeared in *The Army, Navy, and Air Force Gazette* of Mar. 6:—

The celebrations of the Red Army anniversary were held in Moscow on Feb. 22 and 23 on an unusually large scale. Soviet leaders urged their hearers to remember that the Red Army was the backbone of the Five-Year Plan, whose purpose it was to produce a world revolution. All the newspapers published articles explaining the inevitability of war and that the U.S.S.R. was systematically training and organising the people for the world war, which would come as soon as their Five-Year Plan was realised. The allies of the U.S.S.R. were behind the "enemies' fighting lines" disintegrating their armies and fleets preparatory to the coming struggle.

The *Izvestia* published articles pointing out that the disorders in Germany, Spain, Indo-China and elsewhere were a prelude to the battle which would settle the world once for all.

Here is further confirmation of the theories which have been preached in The Aeroplane for the past six or seven years. The Russian Napoleon has not yet appeared. But the time always finds the man.

Judging by the "Anti-God" campaign in Russia at present we may conceivably find ourselves involved in a religious war. Or at any rate, religious persecution of the subjects of European nations may be the cause of the war.

Readers of the latest issue of *All The World's Aircraft* will understand better than most people what is really meant by the Five-Year Plan. Russian Aviation is being developed on a Three-Year Plan, so possibly we may not have to wait five years for the war to begin.—C. G. G.

THE NON-STARTER.

The resignation from the United States Navy of Lieutenant Alford Williams has been accepted. Lt. Williams sent in his resignation rather than go to sea for three years, a duty for which his turn had now come, and would prevent his entry for the 1931 Schneider Trophy Contest. Lt. Williams has been entered for the last two contests but in neither case has he arrived for the race, as his machine has never been ready.

THE B.E.S.A. DINNER.

On Mar. 6 His Royal Highness the Duke of York attended a dinner given at Grocers' Hall to celebrate the Royal Charter recently granted by H.M. the King to the British Engineering Standards Association.

The Duke of York, after acknowledging the toast of "The Royal Family," said that the spirit of co-operation is to be found everywhere to-day in industry. The Association has laboured unceasingly to create and foster this spirit of co-operation and has achieved marked success in persuading the various branches of the great engineering and allied industries of the country to come together and simplify their needs.

He said that he had been told they employed the greatest safeguards to prevent their work from interfering with design; and that these British standards, which are known and valued all over the World, have as their real object the establishment of a basis for the comparison of tenders rather than the standardising of a pattern.

He understood that in our export trade British standard specifications were becoming of enhanced value, and he was glad to think that, with the enlarged financial support recently granted by the Treasury, these specifications could be translated into foreign languages and so place what British manufacturers have to offer before prospective purchasers in their own language.

He concluded by saying that with such an impartial organisation in our midst to co-ordinate the work we need have no fear of over-standardisation or the loss of individual enterprise. We might look forward to the Association increasing its usefulness to industry.

Mr. Maurice F. G. Wilson, who was in the Chair, said that the Association was fully alive to the possible dangers of over-standardisation. A small proportion only of their work dealt solely with the question of the pattern, the majority of their work related to quality and performance. The aim of the Association was to produce, by the consent of all concerned, British standard specifications based on good average present-day practice, without aiming at an ideal which might be too costly for industry to adopt.

Lord Thomson, Secretary of State for Air, said the Association had saved his Department money and trouble in connection with the production of aircraft. It had also assisted in the matter of granting certificates of airworthiness. The standard of airworthiness of British aircraft was unchallenged in the World, and that was a most fundamental factor in the development of a new means of transportation.

ON HOW TO GET INTO AVIATION.

Owing to pressure on space caused by the issue of the Air Estimates and by the announcement concerning the Buenos Aires Exhibition the publication of the second instalment of the article "On How to Get into Aviation" has had to be postponed.—C. G. G.

A BRITISH ENGINE SUCCESS.

An Albert monoplane with an Armstrong Siddeley Genet engine recently made a successful attack on the altitude record for light aircraft, single seaters, 3rd category, 350 kgs. The official figure was 7,730 m. (25,509 ft.).

The engine was a standard Genet and ran for one hour fifty minutes at 2,200 r.p.m. The total duration of the flight 2 hours 10 minutes at temperatures varying between plus 10 degrees and minus 35 degrees.

IMPORTANT DATES.

Mar. 15.—Assoc. Football, R.A.F. v. Army at Homerton.
Mar. 20.—Boxing, R.A.F. College v. R.M.C. at Cranwell.
Mar. 22.—Rugby Football, R.A.F. v. Army at Twickenham.
Mar. 25.—Annual General Meeting of the R.Ae.S.
Mar. 26.—Annual General Meeting of the Royal Aero Club.
Mar. 26.—Rugby, Inter-Unit Cup Final.
Mar. 27.—Inaugural Meeting of the British Gliding Association.
April 3.—M. M. P. Grimault's lecture before the Royal Aeronautical Society.
April 6.—The third Ashwell-Cooke Challenge Competition at Lympne.
April 19.—Leicester Flying Meeting (Leicestershire Aero Club).
April 21, Easter Monday.—Meeting at Hanworth.
May 31.—Bristol Air Pageant (Bristol and Wessex Aeroplane Club). Official opening of Bristol Municipal Aerodrome.
June 9.—Northamptonshire Aero Club's meeting at Sywell.
June 10—15.—F.A.I. Conference, Paris.
June 14.—R.A.F. Garden Party at Manston.
June 21.—Annual Air Rallye at Haldon Aerodrome.
June 21.—Competition for the Gwynn Maddocks Cup at Heston.
June 26.—Ipswich Air Pageant (Suffolk and Eastern Counties Aeroplane Club). Official opening of Ipswich Municipal Aerodrome.
June 27.—Annual Dinner, R.A.F. Dinner Club.
June 28.—Royal Air Force Display at Hendon.
July 5.—King's Cup Air Race (Royal Aero Club).
July 20—Aug. 7.—International Touring Competition.
July 26.—Norwich Flying Meeting (Norfolk and Norwich Aero Club).
Sept. 1—6.—Fifth International Congress on Air Navigation at The Hague.
Sept. 6—28.—International Aero Exhibition at Stockholm.
Sept. 20.—Liverpool Air Pageant (Liverpool and District Aero Club and Lancashire Aero Club).
Sept. 27.—Air Pageant at Hanworth.
Nov. 28—Dec. 14.—International Aero Exhibition at Paris.

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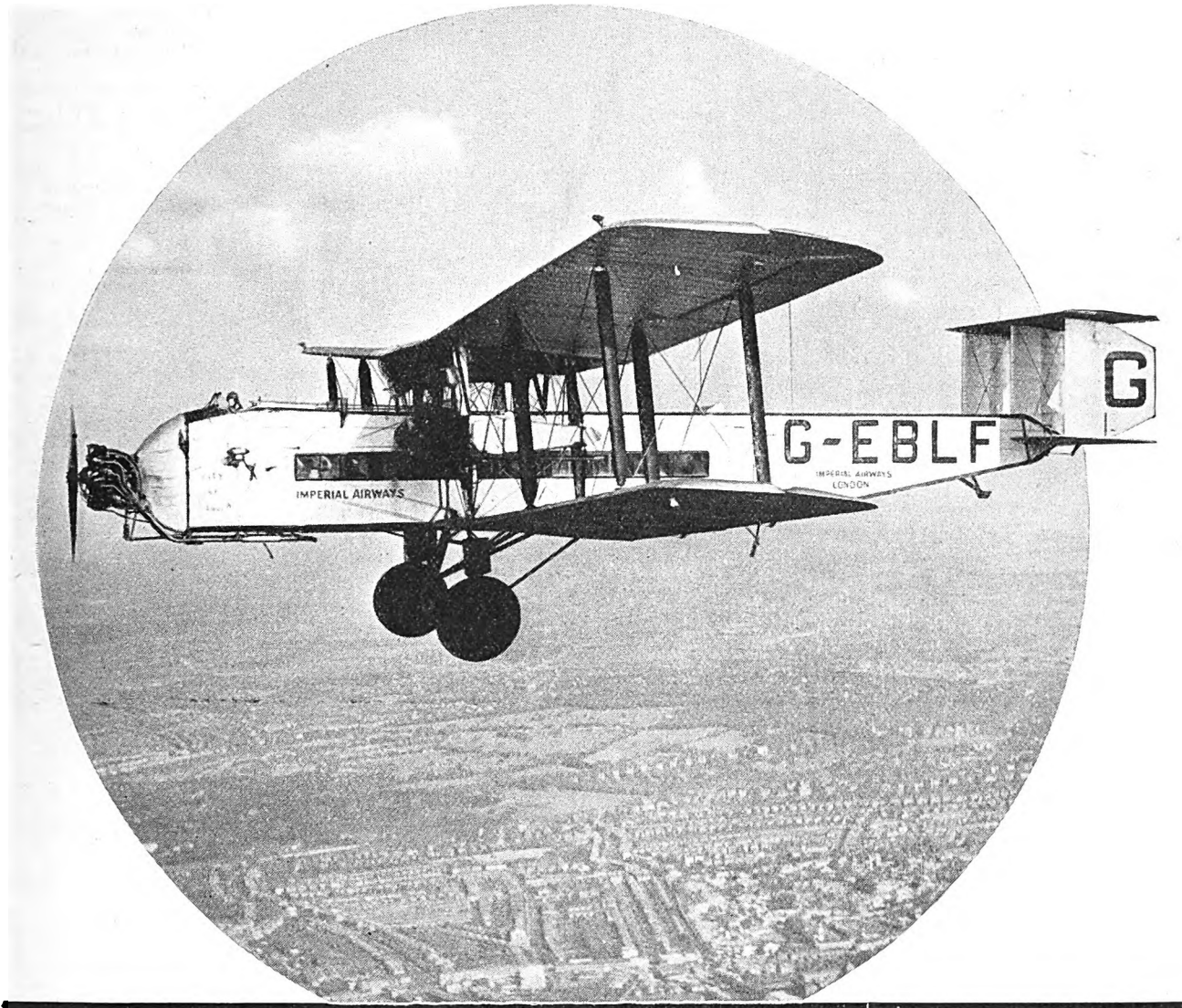

919,320 Argosy Miles

DURING the past 4 years (to October 31st, 1929), seven Argosies in the European Fleet of Imperial Airways Limited have flown 919,320 miles in 10,118 hours. They have carried over 50,000 passengers; they have crossed the channel nearly 4,000 times.

The Argosies are the safest, best paying and most easily maintained Air Liners in existence.

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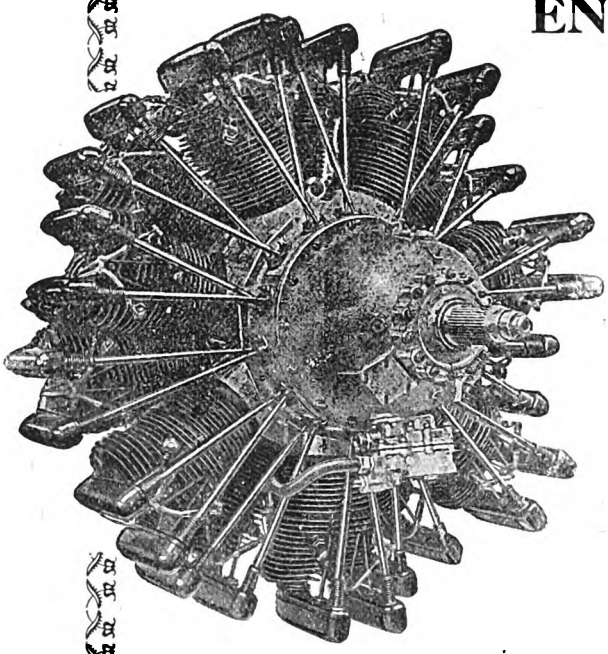
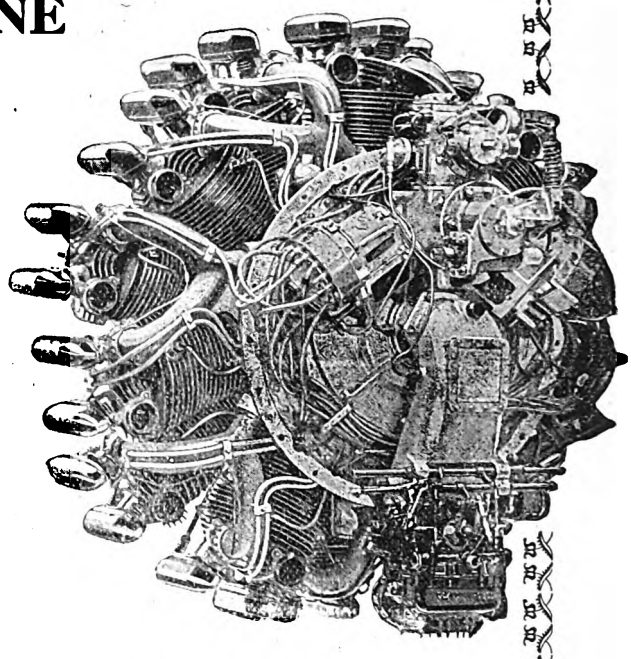
A New ARMSTRONG SIDDELEY ENGINE





The

Jaguar Major (Geared)

THE Jaguar Major is a brilliant addition to the world-famous range of Armstrong Siddeley air-cooled engines. It is made in two types, one with geared fan rated at 525 h.p. at 3,000 feet and developing a maximum of 560 h.p. at sea level, and the other with supercharger rated at 500 h.p. at 11,500 feet and developing a maximum of 450 h.p. at sea level.

The power weight ratio of these two types is 1.75 lbs. (.79 Kg.) per h.p. for the geared fan and 1.98 lbs. (.9 Kg.) per h.p. for the supercharger, while the overall diameter is 46.75 in. (1.187 m.).

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THE ROYAL AIR FORCE.

The London Gazette.

Air Ministry, March 4.

ROYAL AIR FORCE.

GENERAL DUTIES BRANCH.—The following are granted S.S. comns. as Plt. Offs. on probation with effect from and with seniority of Feb. 21:—F. G. L. Bain, G. S. Barrett, L. T. G. Barber, J. H. Bell, W. J. Brighty, H. G. Burgess, H. T. Clark, R. C. H. Crosthwaite, H. I. Dabinett, E. S. Ennals, G. A. C. Foster, D. McC. Gordon, J. A. Hankins, P. G. Harton, N. C. Hendrikz, M. H. Kelly, E. G. B. Kiddle, R. L. Kippenberger, C. A. M. Kyrke-Smith, the Hon. Ferdinando D. H. Lea Smith, R. W. G. Love (Sec. Lt., 1st R.U.Rif., Supplementary Reserve), J. G. Nolan, H. C. O'Loughlin, J. R. Palmer, M. P. Price, R. Ruston, R. C. Stuckes, J. H. Supple, M. S. Thompson, R. B. Wardman, J. R. Watson (Sec. Lt., 57th Med. (Lowland) Brig., R.A.).

The following are promoted with effect from Mar. 5:—

FLIGHT LIEUTENANTS TO BE SQUADRON LEADERS.—G. E. Gibbs, M.C., W. B. Everton, I. Cullen, M.B.E., A.F.C., C. F. Horsley, M.C., J. J. Williamson, A.F.C., G. H. Martingell, A.F.C., R. Harrison, D.F.C., A. L. Fiddament, D.F.C., J. R. Cassidy, S. B. Harris, D.F.C., A.F.C.

FLYING OFFICERS TO BE FLIGHT LIEUTENANTS.—J. H. McN. Campbell, W. T. Holmes, W. E. Symonds, C. Feather, H. E. Nowell, S. H. Hardy, P. S. Blockey, J. A. T. Ryde, F. M. Denny, L. R. W. Tillard, G. D. Middleton.

The following Plt. Offs. are promoted to the rank of Flg. Off.:—A. Haywood (Sept. 2, 1929); H. T. Lines, C. N. McLoughlin, R. F. Williams (Jan. 14); J. T. Stephenson, R. J. Cooper, L. F. Sinclair, A. L. Franks (Jan. 28).

Wing Cdr. F. P. Don is placed on the half-pay list, Scale B (Feb. 27, 1930, to Mar. 29, 1930, inclusive); the S.S. comn. of Plt. Off. on probation G. D. Seabourn is terminated on cessation of duty (Jan. 16).

STORES BRANCH.—Plt. Off. on probation W. J. B. Elliott is confirmed in rank and promoted to the rank of Flg. Off. (Jan. 10).

MEDICAL BRANCH.—The following Flt. Lts. are granted perm. comns. in this rank (Mar. 5):—A. L. St. A. McClosky, M.R.C.S., L.R.C.P., J. M. Ritchie, M.B., Ch.B., B. B. Kennedy, M.B., B.Ch.

Air Vice-Marshal David Munro, C.B., C.I.E., M.B., Ch.B., F.R.C.S.(E.), Honorary Surgeon to the King, is placed on the retired list at his own request (Mar. 1).

Flt. Lt. J. R. Williams, L.D.S. (Temp. Capt., General List, Army, Dental Surgeon), relinquishes his temp. comn. in the R.A.F. on completion of service (Feb. 16).

MEMORANDA.—The permission granted to Sec. Lt. H. A. Hughes to retain his rank is withdrawn on his conviction by the Civil Power (Jan. 6).

The permission granted to the following Sec. Lieuts. to retain rank is withdrawn on their enlistment in the Supplementary Reserve:—C. H. B. Stevenson (Jan. 8); J. M. F. MacDonald (Feb. 10).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—F. Ingham is granted a comn. in Class B.B. as a Plt. Off. on probation (Mar. 4). The following Plt. Offs. are promoted to the rank of Flg. Off. (Mar. 3):—D. H. Duder and R. F. G. Lea. Flg. Off. C. H. G. Bremridge relinquishes his comn. on appointment to a comn. in the R.C.A.F. (Dec. 16, 1929).

Appointments.

Week ending Mar. 10.

GENERAL DUTIES BRANCH.—Group Captain L. A. Pattinson, D.S.O., M.C., D.F.C., to R.A.F. Depot, Uxbridge, on transfer to Home Estab., 29/1.

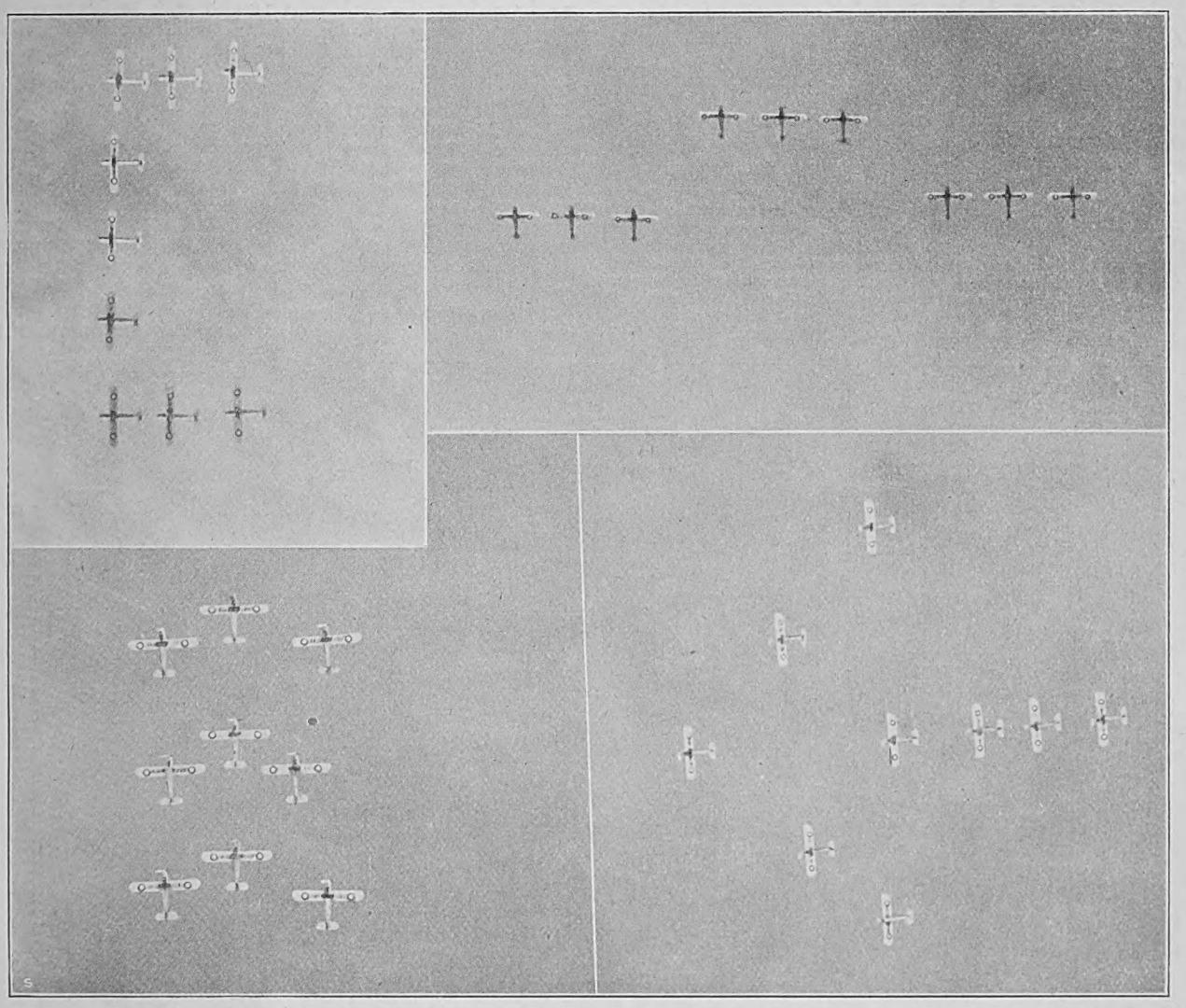
Wing Commanders D. L. Allen, A.F.C., to R.A.F. Practice Camp, Sutton Bridge, to command, 8/3. A. Gray, M.C., to H.Q., R.A.F., India, for Engineer Staff Duties, 9/2.

Squadron Leaders C. A. Stevens, M.C., to R.A.F. Depot, Uxbridge, 29/1. O. G. W. G. Lywood, O.B.E., to Air Ministry, D.O.S.D., 26/2. J. H. Simpson, to E. and W. School, Cranwell, 26/2.

Flight Lieutenants (Hon. Sqd. Ldr.) V. M. Kenny-Leveck, M.B.E., to R.A.F. Depot, Uxbridge, 18/1. J. F. A. Day, A.F.C., to R.A.F. Depot, Uxbridge, 9/2. W. Catchpole, A.F.C., to No. 1 School of T.T. (Apprentices), Halton, 24/2. F. G. S. Mitchell, to Air Ministry (D. of T.), 1/2. C. F. Sealy, to A. and G. School, Eastchurch, 9/2.

Flying Officers T. B. Byrne, to No. 54 Sqdn., Hornchurch, 20/2. H. L. Patch, to A. and G. School, Eastchurch, 9/2. E. J. H. F. Moreton, to R.A.F. Depot, Uxbridge, 18/1. U. S. Mackay, to No. 55 Sqdn., 'Iraq, 5/2.

Pilot Officers G. F. Alexander, to No. 503 Sqdn., Waddington, 9/2. S. H. Turner, to No. 503 Sqdn., Waddington, 9/2. C. M. D. Chambers, to No. 54 Sqdn., Hornchurch, 25/1. The undermentioned are all



FORMATIONS.—A display of formation flying by No. 45 (Bomber) Squadron, R.A.F., at the Royal Air Force Display at Heliopolis, Egypt, on Mar. 3, 1930. No. 45 (B) Squadron is equipped with Fairey III.Fs (Napier) and is commanded by Sq. Ldr. F. J. Vincent, D.F.C.

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posted to the R.A.F. Depot, Uxbridge, on appointment to S.S. Comns., on probation, with effect from 21/2:—F. G. L. Bain, L. T. G. Barber, G. S. Barrett, J. H. Bell, W. J. Brighty, H. G. Burgess, H. T. Clark, R. C. H. Crosthwaite, H. I. Dabinett, E. S. Ennals, G. A. C. Foster, D. McC. Gordon, J. A. Hankins, P. G. Harton, N. C. Hendrikz, M. H. Kelly, E. G. B. Kiddle, R. L. Kippenberger, C. A. M. Kyrke-Smith, Hon. F. D. H. Lea-Smith, R. W. G. Love, J. G. Nolan, H. C. O'Loughlin, J. R. Palmer, M. P. Price, R. Ruston, R. C. Stuckes, J. H. Supple, M. S. Thompson, R. B. Wardman and J. R. Watson.

Medical Branch.—Squadron Leader P. H. Young, to R.A.F. Depot, Uxbridge, 18/1.

Flight Lieutenants J. Parry-Evans, to R.A.F. Depot, Uxbridge, 9/2. E. P. Carroll, to R.A.F. Depot, Uxbridge, 9/2. J. F. McGovern, to R.A.F. Depot, Uxbridge, 18/1.

Stores Branch.—Flying Officer C. I. Fry, to Aircraft Depot, 'Iraq, 31/1.

Accountant Branch.—Flying Officer K. A. Jackman, to No. 4 Sqdn., S. Farnborough, 18/1.

The Royal Investiture.

His Majesty the King held an Investiture at Buckingham Palace on Mar. 11.

Among those in attendance upon His Majesty was Air Chief Marshal Sir John Salmond (Principal Air Aide-de-Camp).

Among those introduced into the presence of the Sovereign and invested with the insignia of the respective Divisions of the Orders into which they had been admitted were:—

The Most Excellent Order of the British Empire (Civil Division): Dame Commander.—The Hon. Lady Bailey.

The Royal Victorian Order: Member (Fourth Class).—Sq. Ldr. David Don, R.A.F.

The Most Excellent Order of the British Empire (Military Division): Officer.—Sq. Ldr. H. James, R.A.F.

The Distinguished Flying Cross.—Flt. Lt. Vivian Parker, R.A.F.

The Air Force Cross.—Flt. Lt. Thomas Horry, R.A.F., Flt. Lt. Henry Waghorn, R.A.F., and Flt. Lt. Edward Fielden, R.A.F.

The Medal of the Most Excellent Order of the British Empire.—Plt. Off. William McKechnie, R.A.F., and Plt. Off. Sidney Wiltshire, R.A.F.

The deeds for which these officers received the decorations were described in The Aeroplane of Oct. 23, 1929, and Feb. 5, 1930, respectively.

The Navy Estimates and the R.A.F.

The Navy Estimates for the year 1930 were issued on Mar. 6 with an explanatory statement by the First Lord of the Admiralty. The estimates for the Fleet Air Arm are Gross £1,267,000, Net £1,267,000. The figures for 1929 were, Gross £1,300,000 and Net £1,300,000.

In the course of his explanatory statement the First Lord of the Admiralty makes the following remarks of interest to the Royal Air Force:—

Aircraft Carriers.—H.M.S. *Glorious* will complete for service in the Spring, and will join the Mediterranean Fleet early in the Summer in place of H.M.S. *Courageous*, which will join the Atlantic Fleet after undergoing refit. H.M.S. *Argus* will reduce to reserve status on the return of the Atlantic Fleet from the Spring cruise.

Fleet Activities Abroad: Mediterranean.—In June the aircraft carrier *Eagle*, on passage to the Mediterranean, successfully searched for and rescued the Spanish flying-boat Dornier 16. In August the situation in Palestine necessitated the despatch from Malta at short notice of units of the Mediterranean Fleet, viz., the battleship *Barham*, cruiser *Sussex*, aircraft carrier *Courageous*, and two destroyers. The South Staffordshire Regiment was conveyed from Malta to Palestine in the *Courageous*. In addition to the troops, a total of 110 officers and 1,000 men and six flights of aeroplanes were landed from these vessels in Palestine. As soon as the situation allowed, this force was withdrawn, and the Naval units rejoined the Mediterranean Fleet.

Co-operation between the Services.—Combined exercises with the Army and Air Force have again been arranged as part of the annual programmes of squadrons whenever it has been possible to do so. Exchanges of officers between the three fighting Services during tactical exercises have been arranged, and the experience gained has proved of considerable value.

Naval Air Work.—Good progress continues to be made in all branches of naval air work, and the amount of flying carried out by embarked aircraft shows steady increase. Eighty-two naval officers are now employed as observers, and six more are under training. One hundred and twenty naval and Royal Marine officers are serving as pilots in the Fleet Air Arm, and 29 are under training for this duty. Of this total, 25 officers have been appointed for a period of general service, on the conclusion of which they will resume flying duties.

Wireless Telegraphy and Signal Development.—A new station for receiving purposes only will shortly be open at Flowerdown, near Winchester, utilising buildings and land relinquished by the Royal Air Force.

Reconstruction and Repairs.—The reconstruction of the *Glorious* as an aircraft carrier is practically finished. She is the last of the three large aircraft carriers converted from cruisers, the other two being the *Furious* and *Courageous*.

The *Courageous* is about to be taken in hand for fitting new water pockets and boiler tubes, and it is intended to commence similar work on the *Furious* during 1930.

Miscellaneous.—Catapults for the launching of aircraft from ships are now installed in several vessels, including the *Resolution* and *Frobisher*, but finality in design has not yet been reached. Several types are being exhaustively tried out, and experimental work is being pursued, active liaison being maintained with the Air Ministry. The trials are being carried out from the *Ark Royal*.

Considerable progress has been made in modernising the anti-aircraft defence of the Fleet and in installing a new system of fire control for the anti-aircraft guns.

The Naval Manœuvres.

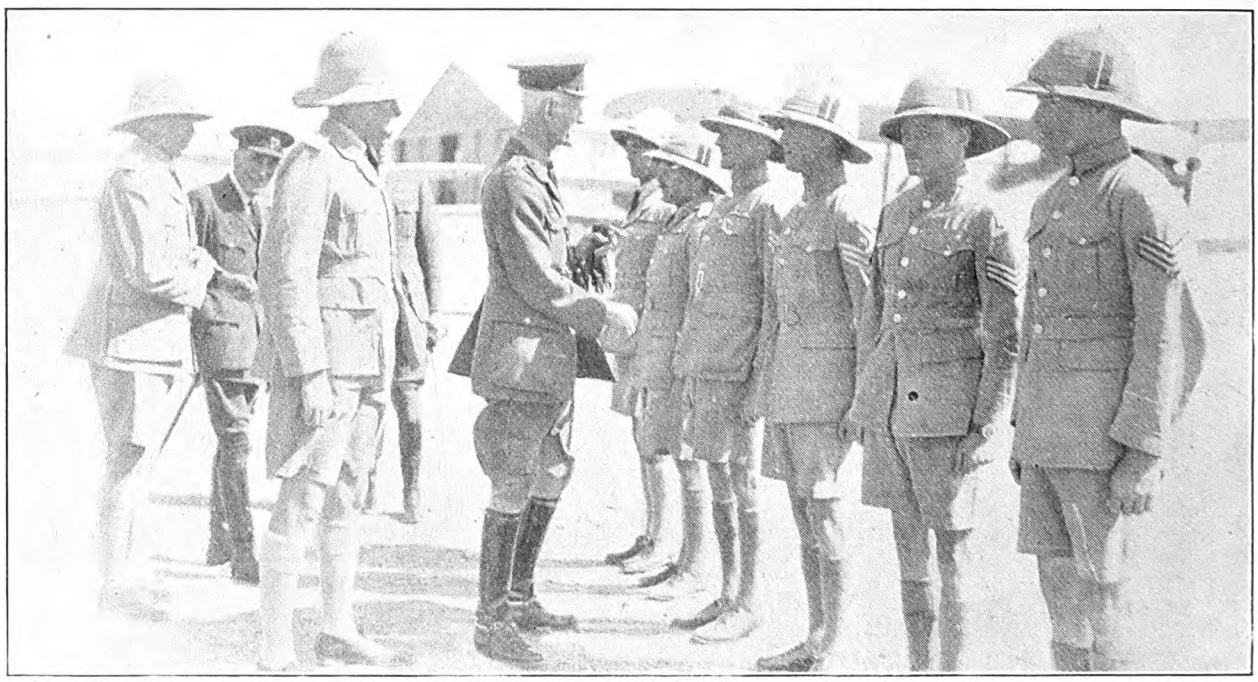
Three aircraft-carriers will take part in the combined exercises of the Mediterranean and Atlantic Fleets in the Mediterranean between Mar. 11 and Mar. 15. These exercises are taking the place of the Naval manœuvres which were formerly held in the summer.

The aircraft-carrier with the Mediterranean Fleet is H.M.S. *Eagle*, and the two with the Atlantic Fleet are H.M.S. *Furious* and H.M.S. *Argus*.

The Mediterranean Fleet sails from Malta on Mar. 8 and the Atlantic Fleet sails from Pollensa Bay on Mar. 9. Destroyer and aircraft attacks will take place during daylight on Mar. 15 and on Mar. 17 the Atlantic Fleet will steam through an area patrolled by submarines and aircraft. During the evening of Mar. 17 both the Commanders-in-Chief will be killed and the subsequent operations will be directed by subordinate flag officers.

The Schneider Trophy Team.

In the House of Commons on Mar. 5, Mr. Granville asked the Under-Secretary of State for Air whether the



CONGRATULATIONS.—Lieut.-Gen. Sir Peter Strickland, K.C.B., K.B.E., C.M.G., D.S.O., General Officer Commanding the British Troops in Egypt, congratulating the personnel of the South African Air Force Flight which accompanied the R.A.F. Flight from Pretoria to Heliopolis. On the left are Brig.-Gen. Brink, Air Vice-Marshal Scarlett, Col. Sir H. A. van Ryneveld and Air Commodore Board.

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LATVIAN GOVERNMENT ORDER MORE "Bristol" BULLDOGS

In 1929, after very close investigation and consideration, the Latvian Government placed an order with the Bristol Aeroplane Co. Ltd. for five "Bristol" Bulldog all-steel single-seater fighters. So pleased are the Latvian authorities with the outstanding qualities of these machines—a satisfaction amply shared by the Latvian pilots—that a further order has been placed for seven additional "Bristol" Bulldogs.

The Esthonian Government has also placed an order for the supply of twelve "Bristol" Bulldogs.

The purchase was decided upon in spite of intense competition by other manufacturers of single-seater fighters from many countries, because the Latvian Government have tested out the Bulldog machine over many months and have found that every claim made on its behalf has been amply substantiated.

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members of the recent successful Schneider Trophy Team were being retained on high-speed flying or were being transferred back to their original or other units.

Mr. Montague said that all the officers of the team had been transferred to other duties.

Mr. Granville asked what promotions had been granted to the members of the team and Mr. Montague replied that he deprecated dealing with individual officers' promotions by way of question and answer in the House. He suggested that information should be sought from the Air Force List.

Captain Balfour suggested that high-speed flying came within the normal flying duties of ordinary Air Force pilots and Mr. Montague indicated assent.

Wing Commander Leigh Mallory.

Wing Commander T. Leigh Mallory, D.S.O., *p.s.a.*, R.A.F., whose Lecture before the Royal United Service Institution is reported on another page of this issue, was born in 1892 at Mobberley, Cheshire, and was educated at Haileybury and Magdalen College, Cambridge. His University career was distinguished; he is an LL.B. of Cambridge and is a History Exhibitioner of Magdalen College, and Third Class Honours in History and Law.

On the outbreak of War in 1914 he enlisted in the 10th Battalion the Liverpool Regiment (T.F.). In April, 1915, he was appointed to a commission in the 4th Battalion (Special Reserve) the Lancashire Fusiliers, and was promoted to Lieutenant two months later. In January, 1916, he was posted to No. 1 School of Aeronautics. From there he went to No. 12 Reserve Squadron, R.F.C., and then to No. 20 Reserve Squadron, R.F.C.

In July, 1916, he was seconded to the R.F.C. as a Flying Officer and posted to No. 7 Squadron overseas. In November, 1916, he was appointed Flight Commander in No. 5 Squadron with the temporary rank of Captain. In May, 1917, he was appointed Squadron Commander with the temporary rank of Major and took command of No. 15 Reserve Squadron on the Home Establishment. In November, 1917, he returned to France and joined No. 8 Squadron, which Unit he commanded until the Armistice.

On the formation of the R.A.F. he relinquished his commission in the Special Reserve on appointment to a permanent commission in the R.A.F. with the rank of Squadron Leader.

He was appointed to be a Companion of the Distinguished Service Order in January, 1919, and was Mentioned in Dispatches in December, 1918.

On his return from France he commanded No. 86 Wing at Kenley and then No. 1 Communication Squadron at Kenley. During 1920 he was Inspector of Recruiting, R.A.F., and in 1921 he was posted to the School of Army Co-operation. During 1922 he passed a course at the Senior Officers' School at Woking and in May, 1923, he was appointed to the Air Ministry for Air Staff Duties.

He was promoted Wing Commander in January, 1925, and during that year he underwent a course at the R.A.F. Staff College.

In April, 1927, he was appointed to command the School of Army Co-operation. In January, 1930, he was appointed an Instructor at the Staff College, Camberley.

Much Ado About Nothing.

In the House of Commons, on Mar. 5, Mr. Thurtle asked the Secretary of State for Air whether his attention had been called to the published declaration of the Rev. Dr. G. C. Carlile, a Royal Air Force chaplain, to the effect that he will disobey a Royal Air Force order relating to chaplains: whether he was aware that such an order was prejudicial to the discipline of the R.A.F.: and whether he would state what action he proposed to take in the matter.

Mr. Montague said that Dr. Carlile's declaration was presumably made under a misapprehension. His position was not that of a commissioned Air Force chaplain but of an officiating clergyman. He was the pastor of a Baptist church at Folkestone which certain men from the R.A.F. Station at Hawkinge attended. No instruction of any kind had been issued to Dr. Carlile by the Air Ministry at the time of his reported statement and no instructions had been or would be issued which affected prayers at the services in his church. The remaining parts of the question therefore did not arise. Dr. Carlile was not amenable to Air Force discipline.

The R.A.F. Memorial Fund.

A meeting of the executive committee of the R.A.F. Memorial Fund was held on March 5. Sir Charles McLeod was in the Chair, and there was a very large attendance of members.

The Committee approved of the accounts and authorised the Hon. Treasurer and the Secretary to sign the accounts and to issue the Annual Report.

The state of the Struben Trust Account was reported to the meeting. This fund concerns help to the relatives of any officer of No. 25 (Fighter) Squadron who may be killed or die while on duty and was instituted by Major Struben in memory of his son, the late Flg. Off. H. M. Struben of No. 25 Squadron. No claim has yet been made on this Fund.

The resignation from the Executive Committee of Sir Sefton Brancker was accepted by the Committee with regret.

The Grants Sub-Committee dealt with 63 cases of appeals for help between Dec. 11, 1929, and March 5, 1930, at their various meetings, during which time the Secretary dealt with 196 cases.

The Committee had before them a proposal to change the title of the Fund. They decided by vote that no change should be made in the present title but that when the Committee issued any posters or publications setting forth the activities of the Fund the following words should be inserted under the title to explain the obligations of the Fund: "For the help of all ranks in memory of those who died serving."

Various grants made out of the Salting Benefaction Fund and out of the Anonymous Education Fund were approved by the Committee.

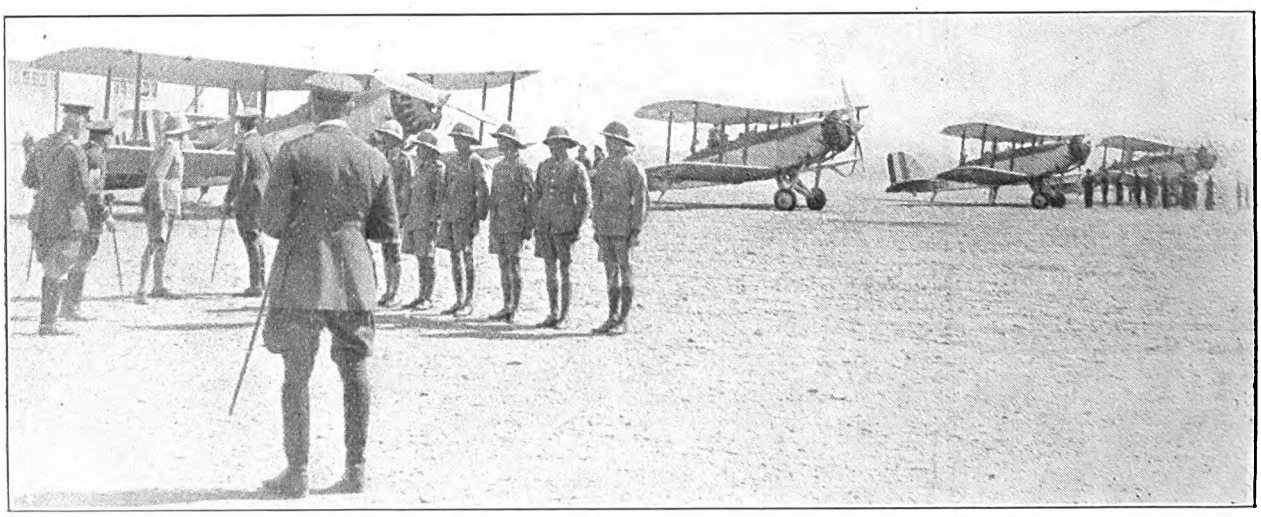
The Re-Union of No. 55 Squadron.

The Twelfth Annual Re-Union Dinner of No. 55 Squadron, R.F.C. and R.A.F., will be held at the Park Lane Hotel, Piccadilly, on Saturday, April 5, at 19.30 hours for 20.00 hours.

All past and present members of "Fifty-Five" who have not received a circular are asked to communicate with the Hon. Treasurer, L. B. Goodyer, 2a, Spencer Road, South Croydon, Surrey, and also to advise any others with whom they may come in contact.

The Dinner Fund annual subscription of 10s. 6d. admits members to the dinner, and they may bring guests at 12s. 6d. per head.

An exceptionally successful dinner was held at the same place last year, and the Committee hope that as many as possible will make a special effort to be present this year.



JOURNEY'S END.—The Westland Wapitis (Bristol Jupiter engines) and the personnel of the South African Air Force Unit lined up after their arrival at Heliopolis.

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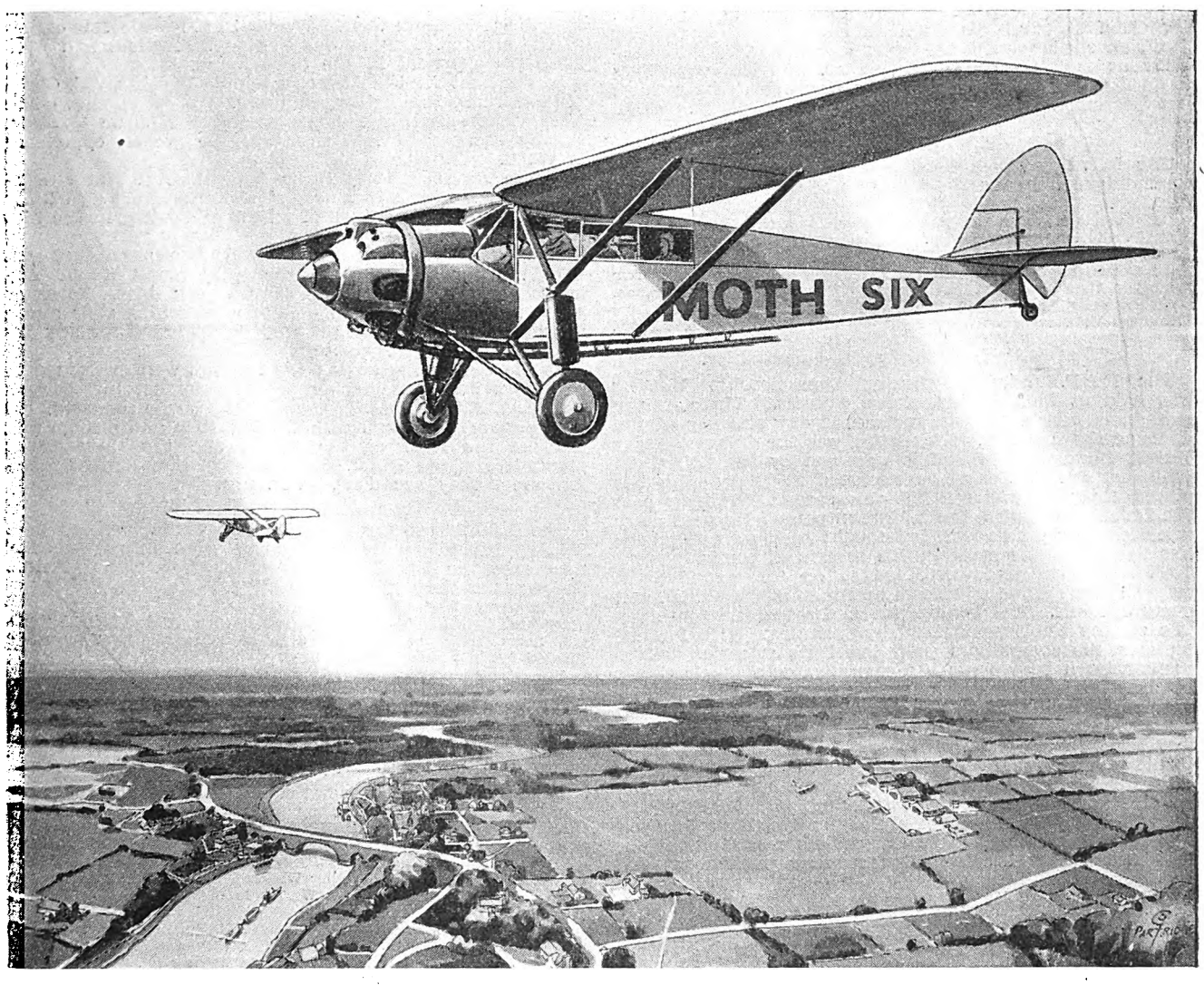

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A Memorial at Northolt.

A Chapel was dedicated for the use of the Royal Air Force at Northolt Aerodrome, Middlesex, on March 9, by the Rev. R. E. V. Hanson, Chaplain-in-Chief to the R.A.F. Air Chief Marshal Sir John Salmond, Chief of the Air Staff, unveiled a memorial tablet to Sq. Ldr. A. G. Jones-Williams and Flt. Lt. N. H. Jenkins, who lost their lives in an attempt to fly non-stop from Cranwell to Cape Town last December.

The Royal Canadian Air Force.

The following appointments are notified in an official communiqué from the Headquarters of the Royal Canadian Air Force, Ottawa:—

On Command to R.A.F. Staff College, Andover, England, from R.C.A.F. Station, Camp Borden, Ottawa, effective Dec. 17, 1929, Flt. Lt. G. R. Howsam, M.C.

On Command to Calshot, England, for Air Pilotage Course from Winnipeg Air Station, effective Dec. 17, 1929, Flg. Off. C. R. Slemon.

On Command to Calshot, England, for Air Pilotage Course from Winnipeg Air Station, effective Dec. 26, 1929, Flt. Lt. A. L. Morfee.

The Individual Boxing Championships.

The R.A.F. Individual Boxing Championship Meeting was held at Uxbridge on March 6 and 7. Three of the semi-finals were fought on the second day and one of the finals on the first day. This latter was the Officers' Heavy Weight Championship and it was won by Plt. Off. C. H. Williams, a New Zealander stationed at Digby who has played Rugger for the R.A.F. this season. Williams beat Flt. Lt. G. R. Beamish, the holder, on points. He went down twice in the second round but fought back so well in the last round that he made up his arrears of points.

All the other finals were fought on the second night before a large crowd of officers and men of the R.A.F. and many civilians. The boxing, for a championship meeting, was on the whole somewhat disappointing. With few exceptions the competitors paid too little attention to the possibilities of body blows and concentrated all their efforts on their opponents' heads. There was also a lot of round-arm hitting and wild swinging. Many of the aspirants for championship honours in the R.A.F. fail to appreciate the fact that the shortest distance between any two given points is in a straight line.

One of the best bouts in the finals was between Plt. Off. K. G. Vandyck (Bircham Newton) and Plt. Off. H. G. J. Purcell (Digby) in the Officers' Feather Weights. Vandyck, who had a slight advantage in height and reach, gained the first round, but Purcell improved under punishment and won on points.

The Officers' Welter Weights provided a surprise. Plt. Off. R. M. Noblston (Netheravon), who is really a Light Weight, knocked out the holder, Flg. Off. F. J. P. Dewhurst (Old Sarum), in the first round with a straight left to the jaw. Dewhurst hit the deck with the back of his head and had to be carried from the scene of action. Sympathetic inquiries from the office of The Aeroplane the following day revealed that a couple of days in hospital will restore him to normal activity. Noblston should be a useful representative of his Service in the I.S.B.A. Championships.

The fight between Flg. Off. R. C. Warner (Upper Heyford) and Plt. Off. W. V. McKechnie, M.B.E. (Calshot), for the Officers' Middle Weights, made up in action what it lacked in skill. McKechnie got a tremendous battering which he appeared rather to enjoy, and he drove home plenty of well-timed blows with all the force and determination that he puts into his work in the R.A.F. Rugger team. Only a very good Middle Weight will rob him of his title next year.

In the Officers' Light Heavy Weights, Flg. Off. D. L. Maclean (Henlow), the holder, lost his title to Plt. Off. Lord Malcolm Douglas-Hamilton (Upavon) after a stiff fight. Douglas-Hamilton, who was Captain of Boxing at the R.A.F. College, Cranwell, has a beautiful straight punch and a quick follow-up. His style is nearly perfect and he moves very swiftly.

Aircraft Apprentice Hobbs (Halton), who won the Midge Weights in the I.S.B.A. Championships in 1929, beat A. C. Hunter (Calshot) in the Airmen's Fly Weights on points after a contest in which too much time was spent in sparring for an opening and too little in hitting. Hobbs has not improved as much as one would have expected in the last year, but as the only Apprentice boxing he made a good impression.

Leading Aircraftman Williamson (Henlow) retained his title in the Airmen's Bantam Weights by beating A. C. Johnson (Manston) on points mainly by virtue of his wider experience.

In the Airmen's Feather Weights, Sjt. Davison (Manston) walked over, his opponent having been disqualified in the semi-finals for holding.

In the Airmen's Light Weights, AC. Herlihy (Gosport) beat AC. Morris (Salisbury) after a fight which was tough enough but without much science.

Sergeant Harper (Henlow) beat AC. Nee (Bircham Newton) in the Airmen's Welter Weights. Nee had already defeated AC. McCann (North Weald) in the semi-finals earlier in the evening. Harper was leading throughout and wore down his opponent in the third round.

In the fight for the Airmen's Middle Weights, AC. Clapp (Old Sarum), the holder, and Cpl. Woods (Henlow) had already won their semi-finals during the same evening. Clapp's energy and initiative beat the greater experience of Wood.

In the Airmen's Light Heavy Weights, AC. Watts (Henlow), a boxer with a very good style, knocked out Cpl. Daley (Felixstowe) of the windmill school of boxing, in the first round.

Leading Aircraftman Jones (Aldergrove) knocked out AC. Forrester (Cranwell) in the third round of the Airmen's Heavy Weights after a very good fight. Forrester relied too much on the defence of a crouching style and a left hook. This fight was a good object lesson for any beginners among the spectators.

At the end of the boxing the trophies were presented to the winners and runners-up by Air Marshal Sir Edward Ellington, K.C.B., C.M.G., C.B.E., R.A.F., who congratulated all the boxers on the splendid show they had put up and thanked the Referees, the Judges and the Management Committee of the R.A.F. Boxing Association for the excellent work they had done.—C. M. MCA.

Boxing in 'Iraq.

The R.A.F. 'Iraq Individual Boxing Championships were held at Hinaidi on Feb. 7. Among those present was His Excellency the High Commissioner for 'Iraq, who presented the prizes at the end of the meeting.

The results of the finals were:—

Officers' Light-weight.—Flg. Off. Taylor (Arm. Car Wing) beat Flg. Off. Louis (70 Sqdn.) on points after an extra round. This was a spirited but not very scientific bout.

Airmen's Fly-weight.—AC. Winslade (55 Sqdn.) beat AC. Watts ("A" Sqdn.) on points. Winslade's experience stood him in good stead and in the third round he scored freely to the head.

Airmen's Bantam-weight.—AC. Love (Arm. Car Wing) beat AC. Palmer (British Gen. Hospital) on points. Love, who held the I.S.B.A. title in 1927 kept an easy margin of points against a plucky opponent.

Airmen's Feather-weight.—AC. Landells (Arm. Car Wing) beat Cpl. Wade (84 Sqdn.) on points. Long range boxing.

Airmen's Light-weight.—Cpl. Bailey (55 Sqdn.) beat Cpl. Bray (Arm. Car Wing) on points. Bray opened promisingly but Bailey scored at will in the third round.

Airmen's Welter-weight.—Cpl. Walker ("D" Sqdn.) beat AC. Bowers (55 Sqdn.) on points. Walker is heavier and has a longer reach but Bowers fought well.

Airmen's Middle-weight.—Cpl. Tillman (84 Sqdn.) knocked out AC. Souden ("D" Sqdn.) in the second round with a right to the jaw.

Airmen's Light Heavy-weight.—AC. Cahalane ("D" Sqdn.) beat AC. New (Arm. Car Wing) on points.

Airmen's Heavy-weight.—AC. Sturgeon ("C" Sqdn.) beat AC. Hadlow ("A" Sqdn.) on points. Sturgeon landed early with good lefts to the jaw but Hadlow retaliated. The second round was even but Sturgeon wore his man down in the third.

Special Three Round Middle-weight Contest.—Battling Hassan (70 Sqdn.) beat Tindal Kerim (Depot) on points.

Rugby Football.

R.A.F. versus Coventry.—The R.A.F. were beaten by Coventry at Coventry on March 8 by four goals and five tries (35 points) to one goal (5 points).

During the first part of the game the R.A.F. put up such a stiff defence that Coventry, who were at full strength and in very good form, were only one point ahead at half time.

In the second half the Air Force defence broke down and they were overwhelmed.

The R.A.F. will play the Civil Service at Halton on March 12 and the Army at Twickenham on March 22. Perhaps one large grave behind the stand at Twickenham would suit the occasion.

OUR COLOURED COVERS.

A correspondent of The Aeroplane, writing from Baghdad of the cover of Feb. 12, says:—

The cover of this week's Aeroplane is beyond praise. It might even be "Fantasy through a glass-bottomed tankard!"

It was, in fact, a glimpse of the River Nile taken through the clouds by an anonymous photographer through the struts and stays of an anonymous aeroplane.

One of the many correspondents of The Aeroplane who has written to this office on the subject of the photograph of Sakhara Pyramid taken from the air which appeared on the cover of Feb. 5, gives the following information which may be of interest to other readers less well informed on these subjects:—

The Sakhara Pyramid was built by a doctor who was also an architect and grand vizier to King Tozer who resigned in the 3rd Dynasty, about 2500 B.C. His name was Imhotep and he was later raised to the status of a god and worshipped as the god of medicine.

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AIR CO-OPERATION WITH MECHANISED FORCES.

A lecture on Air Co-operation with Mechanised Forces was given by Wing Cdr. T. L. Leigh-Mallory, D.S.O., R.A.F., at the Royal United Service Institution on March 5.

Lieutenant-General Sir Archibald Montgomery-Massingberd, K.C.B., K.C.M.G., General Officer Commanding-in-Chief the Southern Command, was in the Chair.

Introducing the Lecturer the Chairman said that Wing Cdr. Leigh-Mallory had been for over two years in command of the School of Army Co-operation at Old Sarum, an appointment which had given him exceptional opportunities for trying-out co-operating schemes with the Army and also for discussing them.

Historical.

Wing Cdr. Leigh-Mallory said that he could not delve very deeply into history when considering the subject he was about to discuss because aircraft had not come into use as weapons of war before 1914 and had not been used in co-operation with armoured forces until August, 1918. The last War had shown that defensive weapons had gained over men's power to advance and warfare had become a matter of attrition. One result of attempting to restore the war of manœuvre had been the tank.

The first movement towards co-operating the work of the armoured vehicle and the aeroplane had been in June, 1918, when No. 8 Squadron had been allotted to work with the Royal Tank Corps.

During the battle on Aug. 8 the Squadron had watched the tanks in action and had reported progress to the Commander. After the advance the Squadron had dropped messages reporting on the enemy movements. In addition to this reconnaissance work the machines had occasionally come down to help the tank where possible.

Considerable damage was done to the tanks during this action by anti-tank guns and one of the results was that a further Squadron, No. 73 Fighter Squadron, was allotted to work with the tanks. The battlefield was examined from the air and from the observations made maps were prepared of future battlefields showing the likely positions of enemy gun-emplacements. From Aug. 21 the Fighter Squadron got to work and assisted by these maps came down and shot up the anti-tank guns. The tanks were tremendously helped in their advance even if only thirty per cent. of the enemy guns were knocked out. The Fighters attacked from behind the gun-shields and stopped the gunners from working the guns while the tanks were advancing. The value of this was shown when taking into consideration the fact that during the Battle of Cambrai in 1917 one German gun had knocked 13 tanks out of action.

[By way of compensation, in the big advance in September or October, 1918, a New Zealand Colonel who had somehow got possession of a German anti-tank gun, put out of action somewhere to the East of Marcoing, five British tanks which had been captured and re-conditioned by the Germans and were being used in a counter-attack.—C. G G]

The Fighters suffered very few casualties, even fewer than the Reconnaissance Squadron, probably because when the Fighters came into action the enemy had all their attention on the advancing tanks and the Reconnaissance machines were up before the battle began. The attack on anti-tank guns by Fighters was the only exception to the rule that it was not worth while attacking troops deployed in the open from the air.

Other valuable work done by Reconnaissance Squadrons in co-operation with Tanks during this part of the War had been photography. One defence against tanks had been placing obstacles in their way and photographs had been taken showing the position of these obstacles. Oblique photographs had also been taken to help tank commanders to find their way about the country.

The operations by the Armoured Force in 1927-28 had been made to see how armoured forces could carry out the duties previously allotted to the Cavalry.

New Developments.

Discussing the new developments which affected air co-operation the Lecturer said that in prepared attacks the Armoured Force Commander required a good deal of information. He would want to know where good cover existed, the most suitable places for tank attacks and where to put bridges across rivers, canals, etc. All this required extensive reconnaissance. After the start of the attack he would want detailed reconnaissance to know what the enemy was doing. This reconnaissance would have to cover forty or fifty miles and might have to be done by machines flying in formation for their own protection. Reconnaissance machines were fitted with radio-telephony in these days which gave direct communication between the machines and the ground in both directions.

During the actual battle the Armoured Force Commander would require detailed reconnaissance to know exactly where to attack, how the battle was going and what enemy reserves, artillery and so on were being brought up.

Co-operation by Fighters.

With regard to defence against supporting artillery, co-operation by Fighters had not been so easy in 1927-28 as it was in 1918 and might be even less easy in the future. The Armoured Force may have advanced forty or fifty miles from the aerodrome and with probably only half an hour before attacking the Commander would find difficulty in getting the Fighters up in time and even more difficulty in letting them know what was happening. If the Fighters were to be effective they must know the line of attack, the time of the attack and the objective, so that they could be on the line a quarter of an hour before the attack. The co-operation of Fighters in these situations was very difficult to arrange and probably not worth while. The situation was different against prepared defences, but then there might be no possibility of getting a Squadron of Fighters for the work.

The present policy of Armoured Formations was to work in co-operation with Infantry and Cavalry in battle and mobile operations. Present experience had put the R.A.F. in a position to co-operate with either kind of formation.

Wing Cdr. Leigh-Mallory thought that there ought to be only one R.A.F. officer directing the Reconnaissance and Fighter Squadrons. When advancing into country with no landing grounds the R.A.F. officer should go up with the Armoured Force Commander and send orders back; but where landing grounds existed forward, the R.A.F. officer should go up by air.

The Close Support Tank had to a certain extent removed the necessity for Fighters but where Fighters were available they could be of the greatest assistance to them in anti-tank gun work. The Close Support Tank was intended to use mainly smoke and its ammunition was laid down as 70 rounds of smoke, 30 rounds of high-explosive and 30 smoke bombs. The Fighters seeing the smoke would know what to attack.

Light tanks, used in conjunction with the medium tank attack, might facilitate locating enemy anti-tank guns before the medium tanks actually became engaged.

Summarising, the Lecturer said that in either the staged battle or the battle of manœuvre Army Co-operation aircraft with their own radio-telephony vehicles to get the messages would be of the utmost value to an Armoured Force. In operations of manœuvre it was unlikely that there would be enough Fighter Squadrons available to co-operate. As time went on the Squadrons might become available.

Defence Against Air Attack.

Defence against an enemy air force by the Armoured Force was at present a matter of concealment. In 1918 although the British Air Force were in a majority of two to one over the enemy Air Force, the Germans managed to do a good deal of reconnaissance behind our lines. The Armoured Force Commander would have to move by night to a concealed area, stay there during the day and move on again the next night. In spite of this the Air Force could definitely see road movements by night. By dropping reconnaissance flares they could even distinguish different types of vehicles.

Taking everything into consideration the Armoured Force had about 70 chances in 100 of getting through by night. Given reasonable cover the Armoured Force had considerable chances of concealment by day. The Lecturer himself had flown over a concealed force several times, and although he knew where they were he had not been able to spot them. On one occasion a large force had been successfully concealed from aeroplanes and had been accidentally discovered by a stray cavalry patrol.

A concentrated Armoured Force was particularly vulnerable to air attack. Aircraft could also very easily disorganise the petrol supply system of an Armoured Force. The only country in which we had our own petrol supplies was 'Iraq Petrol ships and dumps were easy to locate and destroy. He had flown over the dumps at Avonmouth in 1927 and had thought that one bomb would set the whole place alight.

If the enemy could find the Armoured Force concentrated he could easily destroy it. Sometimes it was necessary to concentrate an Armoured Force. Cover might be very scarce. Also when making certain movements the Wireless Telegraphy had to be silenced and despatch riders could not be used because of the noise they made. In such cases the Commander had to concentrate his Force. Armoured fighting vehicles were not vulnerable to air attack once they were deployed.

By driving the enemy aerodromes back fifty miles you would reduce his effort considerably. [Fifty miles is of little consequence to air scouts doing 200 to 250 m.p.h.—C. G. G.]

Aircraft should be used to attack enemy columns when the enemy was slipping away to gain the advantage of the battle ground.

THE DISCUSSION.

A Member of the Audience asked why it was necessary to have Fighter Squadrons. Could not the Army Co-operation Squadrons do both the reconnaissance work and also the anti-tank gun operations and other Fighter work.

The Lecturer explained that one of the difficulties with Fighters

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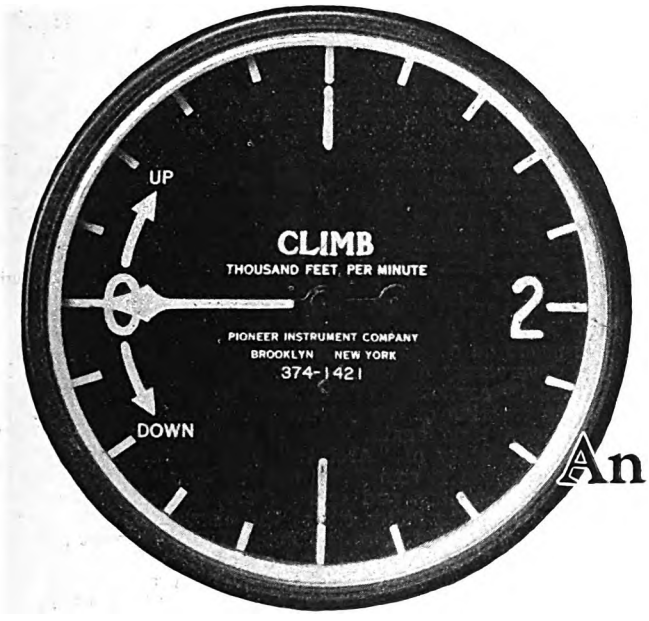

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was the inability to get orders quickly enough to them, which difficulty applied equally to Army Co-operation machines. Also Army Co-operation machines were unsuitable for attacking work. On Aug. 8, 1918, such machines had been used for this work in addition to their reconnaissance work and in one day ten machines had been written off and nine had been withdrawn for major repairs.

The Secretary of the R.U.S.I. (speaking as a former Naval Officer) said that Army Co-operation aircraft working in co-operation with Armoured Forces destroyed the essential element of surprise. Also there was the possibility that aircraft might drive off a timid enemy before the greater formations had a chance of getting to grips. The Navy had found that their aircraft would disperse an enemy that the Battle Fleet were anxious to meet and destroy. [Which is the kind of argument "Neon" would use against the use of aircraft as scouts. Did not cavalry scouts and small fast ships equally betray the presence of supporting forces in the past?—C. G. G.]

Wing Commander Leigh-Mallory said that the radius of action of reconnaissance aircraft made it very difficult for the enemy to know exactly what part of the line was being observed. In Naval operations the speeds of the rival fleets were the same and therefore if one was scared off the other could not catch it. A Division could not clear off in that way and an Armoured Force could easily catch it up.

The Chairman said that the danger of a concentrated Armoured Force from air attack was even greater when that Force was accompanied by supporting columns of Infantry in mechanical transport. Such a column consisting of two Brigades might occupy about 13 miles of road space. The Lecturer had explained that it was no very great protection to move them by night. Would it not be advisable and possible to use spare aircraft to protect such columns. Anti-aircraft guns were not a satisfactory form of protection. He also thought that the Armoured Force should not be hampered by Infantry which destroyed their mobility.

With regard to the concealment of the Armoured Force, surely it would be cheap and easy for the enemy Air Force to bomb all possible cover without waiting to discover which cover hid the Force.

Wing Commander Leigh-Mallory said that the method of protecting a column depended on the degree of air superiority. A possible method of keeping all enemy machines out of the air was to centralise the control of aircraft and thereby ensure temporary air superiority at any given time and place. Using this method in 1918 the Germans had concentrated their aircraft at the point where the British broke through and in one day had shot down 85 British machines. [And everywhere else along the line the R.A.F. thought that they had driven the enemy out of the air.—C. G. G.]

The Chairman, proposing a vote of thanks to Wing Commander Leigh-Mallory, said that as mechanisation developed and as aeroplanes developed the co-operation between the two was bound to develop. Undoubtedly a mechanised force could be brought to a standstill by a well used air force.—C. M. MCA.

THE AYES HAVE IT.

[*Twenty Thousand Miles in a Flying-boat.* By Sir Alan Cobham, K.B.E. 250 pages, 8½ in. by 6 in., and 46 illustrations. G. G. Harrap and Co. Ltd. Supplied by The Aeroplane Book Dept., Cannon House, Pilgrim Street, E.C.4. Post free 11s.]

Writing of Sir Alan Cobham in *Punch* of Mar. 23, 1927, Mr. A. P. Herbert said "who combines with an apparently inexhaustible vitality, a habit of perpetual achievement."

When the Sir Charles Wakefield Flight of Survey, of which this book is a description, was in course of preparation, a map of the proposed route was shown by the present writer to a man whose experience of practical seamanship began about forty years ago and has not ended yet. This man expressed the opinion that Cobham would never do it. That he and his crew did do it is now a matter of history and that he has written a book about it merely continues his "habit of perpetual achievement."

The expedition was not a lucky one. In many ways it seemed dogged by ill-luck. At Malta a series of mishaps put the Singapore out of action altogether and it was several weeks before spares could be sent out from England and the machine repaired and ready to start again. At every stopping place the chief trouble was the anchorage, which was either in the wrong position or else not sufficiently protected from the attentions of interested native craft.

Sir Alan Cobham's descriptions of places and people are always interesting and the expedition gave him a wonderful opportunity for telling a good tale of travel and adventure.

The book is well illustrated and would make an ideal present for a school-boy.—C. M. MCA.

LAW.

[*Aeronautical Law.* By W. Jefferson Davies. Published by Parker, Stone & Baird Co., Los Angeles. Supplied by The Aeroplane Book Dept., Cannon House, Pilgrim St., E.C.4, £2 3s., post free.]

Judging by this most compendious volume of over five hundred pages American Lawyers are going to have lots of fun and games within the next few years, especially if the proposed Uniform State Law relating to Aviation is passed in its present form.

It comes as rather a pleasant surprise to realise that although America, for natural reasons, has far outstripped Europe in the development of commercial air transport, it has yet lagged considerably behind Europe in the solution of the legal problems arising out of such development. American distrust of the League of Nations and the consequent failure to ratify the International Air Convention is to some extent responsible for this state of affairs, while the wide legislative powers possessed by the individual States and the conflict of view between the State Authorities and the Federal Government on the subject of their respective rights and powers has still further retarded the evolution of sound and uniform legal principles to govern the problems of Civil Aviation.

The student of Law and of History will find much to interest him in those portions of the volume which deal with the forensic contests culminating in the Air Commerce Act of 1926 and the Havana Convention of 1928, the latter being modelled faithfully upon our own International Air Convention. He will be interested also in the lucid discussions of various good old English legal doctrines as applied to aerial navigation: the rule in Fletcher v. Rylands, the *Res ipsa loquitur* doctrine as applied to accidents and the *usque ad coelum* doctrine as opposed to the principle of the sovereignty of the air, all have their turn. The last-named in particular (which may be colloquially translated as the doctrine of the private ownership of air) is sent up time and time again, only to be brought down by the author's battery of "Archies." The reader's enjoyment of the discussion is sometimes marred by an irritating repetition of quotations and *obiter dicta*, but at least one very interesting point arises out of the discussion. The Air Commerce Act of 1926 gives the Federal Government the power to delimit "navigable air and space." In other words they can decide the exact height at which aircraft have the right of passage over any particular piece of land. It follows that if municipalities fail to protect the approaches to their airports by Building Bye-laws, the Government could, by bringing the navigable air space down to a height of fifty feet within a radius of one hundred yards from the borders of the landing ground, prevent the erection by land owners of anything which would endanger air navigation within this area. The author suggests this as a method of dealing with the proposed "spite fence" on the borders of a New York Aerodrome and it would be equally applicable to similar erections, or threatened erections, in England.

It may be wondered how, in view of the embryonic state of Aeronautical Law in America, the author has managed to fill over five hundred pages upon the subject. The answer lies in the fact that the volume is far more than a mere legal text book, or a discussion of the legal problems. It is split up into six main parts under the following headings: (1) The Scope of Federal and State Control of the Air. (2) Ownership, Operation and Control of Airports. (3) Regulation of Aircraft Carriers. (4) Liability and Insurance. (5) International, Federal and State Regulations concerning Air Navigation. (6) Bibliography of Air Law.

Within these various parts will be found, in addition to the historical and prophetic discussion of the abstract problems, a very full record of the existing legislation upon the subject in America, and the texts of proposed future legislation. The chapters upon Airport Rating Regulations, Federal Licensing Regulations, Flying School Regulations and the proposed Uniform Field Rules (i.e., Aerodrome Regulations), based as they are upon a practical experience of commercial aviation greater than our own, might be studied with interest and advantage by all aircraft operators in this country.

The development of Aviation is so rapid that any volume of this nature must needs be the subject of frequent revision if it is to be kept up to date. Nevertheless it represents the most complete exposition of the subject yet produced and one which Lawyers, Airport owners and aircraft operators alike would do well to digest.—A. G.

AIRCRAFT INSTRUMENTS.

[*Aircraft Instruments.* By C. J. Stewart, O.B.E., F.R.Ae.S., M.I.M.E. Chapman and Hall. Supplied by The Aeroplane Book Department, Cannon House, Pilgrim Street, London, E.C.4. Price 21s.]

The general arrangement of this book is well conceived and the subject matter ranges through instruments for measuring height, rate of climb, air speed, engine revolutions, fuel flow, pressures, and temperatures, to compasses, navigating instruments and calibrating devices, finishing with a description of the oxygen apparatus used at high altitudes, and a chapter on the automatic control of aircraft.

The treatment is accurate and comprehensive,—although the author at times expects too much initial knowledge on the part of the reader,—and a good index and footnote references add to its value.

Such a work will appeal to the student and the designer of instruments or aircraft, and will at the same time stimulate the inventor, for the author's wide experimental experience gives an air of finality to his criticisms of the faults and shortcomings of particular instruments.

The author has excelled in the use of adverbs and such expressions as "pendulously mounted" certainly have the

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merit of shortening a description, but "downwardly" seems unnecessary.

The diagrams and photographs are a continuous joy, they are so clear and pleasing that the attention is immediately attracted. Two very instructive features are the scales on some of the photographs and the names of parts on various diagrams.

Reading between the lines of the book one can but marvel at the amount of work done at the Royal Aircraft Establishment all of which is pioneer work and is the application of sound scientific knowledge to that most delicate of operations the construction of an instrument of precision.

Only those who have attempted the development of a measuring instrument from the first crude idea to the finished article can estimate the patience and tenacity of purpose needed to overcome the thousand and one difficulties which arise.

The publishers are to be congratulated upon the production of a volume which is outstanding in the clearness of its letterpress and the excellence of its illustrations.

A photograph of the cockpit of an aeroplane, opposite page xix of the Introduction, showing the usual instrument dials in position, would, it is believed, have brought the subject home more forcibly to the reader.—O. S. S.

OUR IMPASSIONED PACIFISTS.

In a debate before the Union Society, Cambridge, Mr. R. A. Binning (St. John's College) moved:—"That in the opinion of this House a reduction in Naval Armaments, to be followed by an increased expenditure upon our services of Military and Commercial Aviation, would be in the best interests of the Empire."

Mr. Binning said that in many points of strategical importance in the Empire air forces could now more profitably serve us than naval forces. He referred to Malta, to Singapore, and to coastal defence. Our natural prestige had been more enhanced by the winning of the Schneider Trophy than by any battleship programme we might embark on. We were woefully behindhand in the development of our civil aviation services.

Mr. Holdsworth (Caius College) announced himself a wholehearted believer in general disarmament and did not agree to the spending on aviation of such money as we might save on naval armaments. Moreover he believed the potentialities of military aircraft to be much over-estimated. Flying was only possible on an average of 150 days a year and aeroplanes were useless at night for reconnaissance. Civil aviation was a costly, unreliable, and dangerous method of transport.

Colonel Thwaites of the Air League and Commander Denny of the Navy League both pointed out how futile it was for Great Britain to continue making gestures in the direction of disarmament while other Powers refused to do likewise.

Colonel Moore-Brabazon dwelt on the civilising influence of aviation which he said was our latest and best method of communication. He foresaw an inevitable future development in our Services whereby all three would combine in close co-operation as one body for the defence and protection of the Empire.

Mr. Jenks (Caius) made a lengthy pacifist speech.

Mr. Gamlin said that if war was to become a thing of the past people must get to know each other better. Such knowledge could only come through more travel and better communications. [This is a singularly popular form of bunk. There are some people who seem quite pleasant, or attractive or amiable till you have to live among them.—the Southern Irish for example,—and close contact only destroys illusions. Other people improve on acquaintance, —like the Germans. So on balance no difference is made. The only effect of quick and easy communication is to regroup the belligerents.—C. G. G.]

Mr. Dhavan said that the experts who had taken part in the debate had paid but lip service to the ideal of disarmament. They were really out for a new race in armaments, more perfect in technique and more malicious in spirit. [And the more deadly the armament the smaller is the percentage of casualties.—C. G. G.]

The House divided. Ayes 60. Noes 93. Majority against the Motion, 33.

AIR POLICY WITHIN THE EMPIRE.

At the Twelfth Congress of the Federation of Chambers of Commerce of the British Empire, which is to be opened by H.R.H. the Prince of Wales at the Guildhall on May 26, a number of resolutions on Civil Aviation are to be put forward by the London Chamber of Commerce. These have been prepared by the Civil Aviation Section, of which Sir Harry Brittain is the Chairman.

The importance of developing the Empire's air communications, the value to trade of rapid transit, and the establishment of a complete network of air routes throughout the Empire is the subject of one of the main resolutions to be submitted.

The Governments over which the extension to the England—India route to Australia will pass are to be urged to establish the necessary ground organisation and to give financial assistance for the establishment of feeder services to this main route.

Another need is the development of Municipal Airports and the local authorities in all the larger towns throughout the Empire are to be urged to make immediate provision for such facilities.

The International Postal Union will be asked to urge the adoption of a special flat rate for Air Mail instead of the ordinary stampage on one basis and the Air surcharge on the other, as it is felt that the present method of sending forward under-franked letters by the ordinary sea route is a serious handicap to the general use of the Air Mail.

Resolutions to recommend the extensive use of survey from the air in mapping undeveloped areas throughout the Empire and the provision of facilities for the study of aeronautics in educational establishments are to be submitted.

[All of which are entirely worthy and well-meaning objects. The Chamber of Commerce is certainly doing its best.—Ed.]

ASKING FOR HELP.

According to *The Times* the Civil Aviation Section of the London Chamber of Commerce have recently had under consideration the question of the difficulties which have been and are being experienced by commercial flying schools and similar organisations in competition with subsidised firms and clubs. They have accordingly made the following representations to the Secretary of State for Air:—

They are fully in agreement with the application which has been made to the Air Ministry by the Associated Light Aeroplane Clubs' General Council urging continued assistance for approved clubs; while they also consider that a similar grant should be made to all unsubsidised clubs which may be approved by the Air Ministry, due regard, of course, being given to their territorial position and other circumstances. They recommend that training schools, as distinct from flying clubs, should be subsidised on a similar basis—namely, by a fixed payment per pilot for a certain period.

They further urge that organisations providing and maintaining air ports, air parks, and aerodromes generally, should be encouraged to the utmost by financial means and otherwise, both direct and through municipalities.

THE GROUPING OF THE FRENCH AIRCRAFT INDUSTRY.

Early in the new year the grouping of the French Aircraft Industry became an accomplished fact with the formation of two big aircraft groups—the *Société Générale Aéronautique* and the *Groupement Aéronautique Industrielle*.

The *Société Générale Aéronautique* (S.G.A.) is a limited company and was formed with a capital of 450 million francs (about £3,600,000). It includes the Lorraine Company, which had already absorbed the Hanriot Company, Nieuport-Delage, which has taken over the aircraft department of Dyle and Bacalan, which department is now known as the Société d'Aviation Bordelaise, S.E.C.M., which had previously united with the Latham Company, and finally the C.A.M.S. Company.

The *Groupement Aéronautique Industrielle* (G.A.I.) include the Breguet, Potez, Lioré-et-Olivier, Renault, and Hispano-Suiza companies. It is not a company, but is more a group the formation of which has as its object "the creation of an industrial and commercial solidarity which must eventually become closer and closer."

The formation of the latter group, which had been in course of preparation for nearly a year, was precipitated by the formation of the S.G.A.

The object of these groupings is to draw together the various sound units of the French Industry into organisations strong enough to resist the difficult times with which the Industry is faced.

NO BALLOON FOR CHELSEA.

In The Aeroplane for Mar. 5 an Air Ministry warning was published concerning a Goodyear balloon which was to fly from Lots Road, Chelsea, for seven months.

Although Air Ministry permission was obtained for the flying of this balloon for advertising purposes in the element over which only the Air Ministry, by virtue of its name, should have jurisdiction, another official body has ruled otherwise. The London County Council has prohibited the use of this 12 ft. balloon under the Buildings Act, presumably to prevent the possibility of a portion of London County being alienated from its Council by direct lift.

AN INDIAN ATTEMPT.

On Mar. 3 Mr. R. N. Chawla, a member of the Karachi Aero Club and a native engineer, left Karachi in a D.H. Moth. They had hoped to reach Croydon in nine days. On Mar. 5 they arrived at Baghdad.

Mr. Chawla and a mechanic on Jan. 7-12 of this year flew from Karachi to Delhi and back. This journey was a record for native aviators.

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95 H.P. - - 7 CYLINDERS.
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Madame Maryse Bastié, flying a CAUDRON 109, with a 40 H.P. SALMSON engine, remained in the air for 26 hrs. 47 mins. (28th July, 1929).

AUGUST, 1929.

The Polish aviators, Zwirko and Wigura, using an R.W.D. with a 40 H.P. SALMSON engine, accomplished the following flight:—

Warsaw—Berlin—Paris—Barcelona—Marseille—Milan—Venice—Vienna—Cracovie—Warsaw,

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Until the British Factory is in production these engines can be supplied from France, with all necessary certificates.

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AIR-COOLED ENGINES AND THE REDUCTION OF HEAD RESISTANCE.

The Townend Ring.

On March 6 Mr. H. C. H. Townend and Major F. M. Green read their papers before the Royal Aeronautical Society. Mr. Townend described the development of his Ring and Major Green discussed the Resistance of Air-Cooled Engines. The Aeronautical Research Committee R. and M.* on the subject has just been released and those who wish for the complete report on the subject together with the relevant curves and tables should have a copy.

Mr. Townend explained that the idea for the Ring arose from an experiment about airscrew-body interference. A ring of large diameter and roughly of streamline section was placed co-axially with a good streamline body in the plane of the nose. The ring was supported independently of the body and was found to reduce its drag. By improving the streamline section of the ring the drag of the body was reduced to nothing.

Further experiments with smaller rings showed that improved results could be obtained by making the chord of the section of the ring parallel to the (calculated) local streamlines.

A further surprising result was got with a ring of small diameter placed just forward of the nose. The drag of the body was doubled, but in the reverse direction,—that is the ring actually towed the body forward. At the same time the body was strongly repelled from actual contact with the ring

The force on the various types of rings was measured. Although the combined drag of the body and ring was very much higher than the body alone, it was generally less than that of the ring alone, and almost always less than the sum of the separate drags of the ring and body.

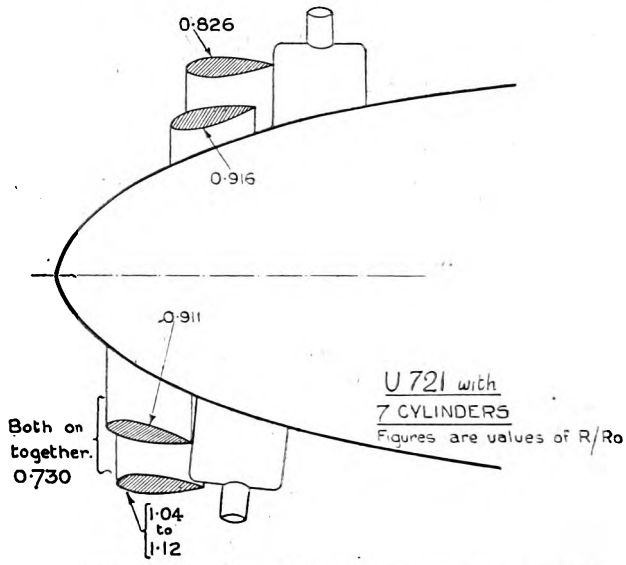
As similar reductions in drag were found when the body had an annular excrescence (made by attaching a ring of rubber tube around the nose in a position similar to that occupied by a radial engine) Mr. Townend thought that a ring might be made to kill three birds with one stone. First the drag of a radial engine might be reduced. Secondly, the ring might take the place of the usual exhaust pipes. Thirdly the ring when used as an exhaust-collector might act as a silencer.

When the tests were continued with a model engine placed in the nose of the body, results showed that the overall drag could be reduced to a figure lower than that for the engine and body only. At first the ring gave the best results when placed behind the cylinders but later even better results were obtained with the ring in front of the engine.

Further tests and experiments made with a smoke-jet discharging just in front of the gap between two cylinders supplied the physical explanation of the action of the ring.

The ring works best at considerable angles of incidence to the local air-flow and exerts a down- or in-wash upon the body behind the ring. The air-flow which has been upset by the cylinders is thus forced down upon the body.

Mr. Townend had brought a bulky piece of apparatus along and with it gave a practical example of the action of the ring. Air was blown over a two-dimensional model (that is a model which has the same elevation as the body it represents but in plan is merely rectangular.) In the nose of the model was a row of cylinders with an aerofoil representing the ring in two dimensions. There were a number of streamers which showed the alteration in air-flow when the angle of the aerofoil was changed. By means of a mirror the shadows of the model and streamers were cast on the screen.



A diagram which shows two rings, with the engine in the forward and rear positions. In the forward position the inner ring decreased the drag by un-stalling the larger ring.

The next series of tests were made with a two-dimensional body and struts in place of the ring, as Mr. Townend thought that this method would give sufficient indication of the results to be expected from various changes in section, chord diameter and disposition of the ring. This method made the changes and modifications much easier to make.

The first large model of an actual aircraft to be tested was the one-quarter scale model of the Short Crusader, Bristol engine, which was designed for the 1927 Schneider Trophy Contest. The drag of the complete model was reduced by 20 per cent. This should give an 11 per cent. increase in speed. [This one imagines should have brought the speed of the Crusader very close to that of the winning machines in that year.—Ed.]

A number of other tests were made with models of an Armstrong Siddeley Jaguar and a modified model of a Bristol Bulldog (Jupiter engine) which gave reductions in drag of just over, and just under, 50 per cent. respectively. [That is reductions in the drag caused by fitting on the engine.—Ed.]

More tests showed that fitting an engine to a model decreased the maximum efficiency of the airscrew by 11 per cent. If the engine with a ring was added the maximum efficiency was only reduced by 4 per cent.

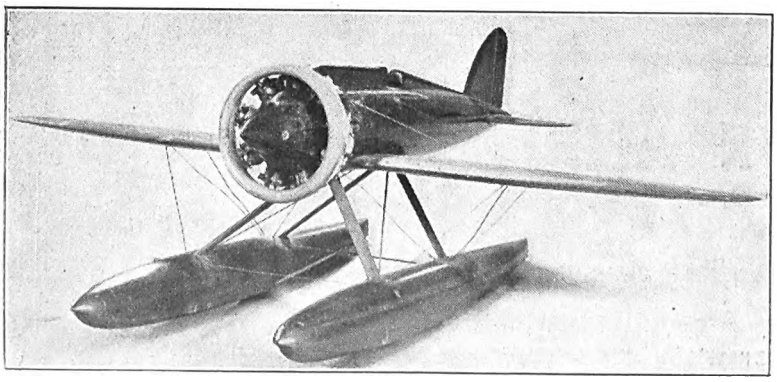
Summarising his results Mr. Townend said that the thin-cambered plate sections generally give the best reduction in drag. If the ring is required, however, to collect the exhaust gases a pretty good reduction of drag can be obtained with a thick symmetrical wing section.

Increasing the chord to 12 to 14 in. on the full-size rings increases the reduction of drag for the two engines mentioned,—that is the Jaguar and Jupiter.

The best camber for the thin plate sections was from .09 to .1 chord. The best angle for the chord-line cannot be given but should be such that the section has sufficient incidence to the local air-flow to work at fairly high lift though not enough to risk stalling. For a ring with 12 in. chord its trailing edge should be over the centre line of the cylinders. Rings of larger chord should extend further aft. Radially the ring should be so placed that the diameter of its trailing edge should not exceed the diameter of the engine. [There is always the possibility that these proportions may be completely wrong at high speeds,—for wind-tunnel results, being achieved at low speeds, are apt to be very misleading.—Ed.]

A number of other tests have shown that the principle underlying the ring could be applied to other objects to decrease the drag. [The idea is that a strut or ring of aerofoil section will force the air to flow through grooves and past obstructions when in the ordinary way the air would break away and flow turbulently.—Ed.]

*R. & M. No. 1267. *Reduction of Drag of Radial Engine by the attachment of Rings of Aerofoil Section including Interference experiments of allied nature with further applications*, by H. C. H. Townend, B.Sc., price 4s. 0d., printed by H.M. Stationery Office and obtainable from The Aeroplane Book Department, Cannon House, Pilgrim Street, E.C.4.



A quarter scale model of the Short Crusader with a thick section Townend ring.

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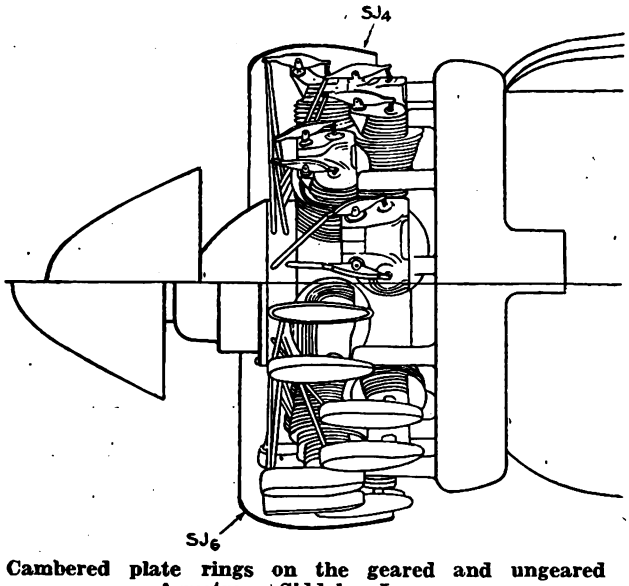


Cambered plate rings on the geared and ungeared Armstrong Siddeley Jaguar.

The drag of a flat disc has been reduced 62 per cent. by surrounding it with a ring of one and a half times its own diameter.

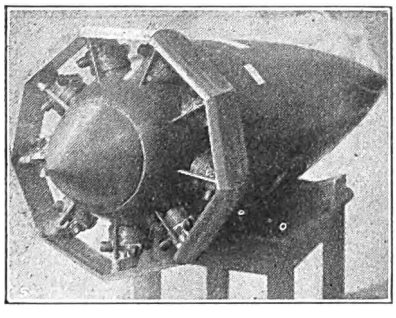
Mr. Townend closed his paper by quoting results obtained by Armstrong Whitworth Aircraft Ltd., and at Martlesham Heath. The speed of a Siskin (Jaguar) had been increased by 7 to 9 m.p.h. Nearly 5 m.p.h. was added to the speed of a large twin-engined machine with interplane engine nacelles. A twin-engined monoplane with a Lynx engine in either wing gained 7 m.p.h. near the ground. The ring also improved the maximum lift of the wings. The joint effect increased the ceiling by several thousand feet.

[Apparently the N.A.C.A. cowling, which has been so successful in the United States, is a particularised example of the Townend ring, with modifications and improvements to better the cooling of the engine. Each fuselage and each engine seems to call for special modifications of the ring or cowling. For example, fitting the N.A.C.A. cowling to a tri-motor Ford,—which should have increased the speed 15 or 20 m.p.h., judged by the effect on the Lockheed Vega,—actually decreased the speed 5 m.p.h., because of the air-jam between the wings and the upper part of the cowling of the wing engines.—ED.]

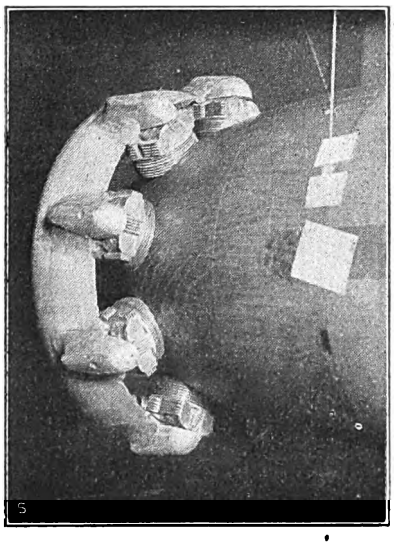
MAJOR GREEN'S PAPER.

Major Green opened his paper on "The Resistance of Air-Cooled Engines" by explaining that the drag added to a body by an air-cooled engine can conveniently be considered as a measure of the horse-power required for air-cooling and as aircraft increase in speed this loss of power becomes more and more important.

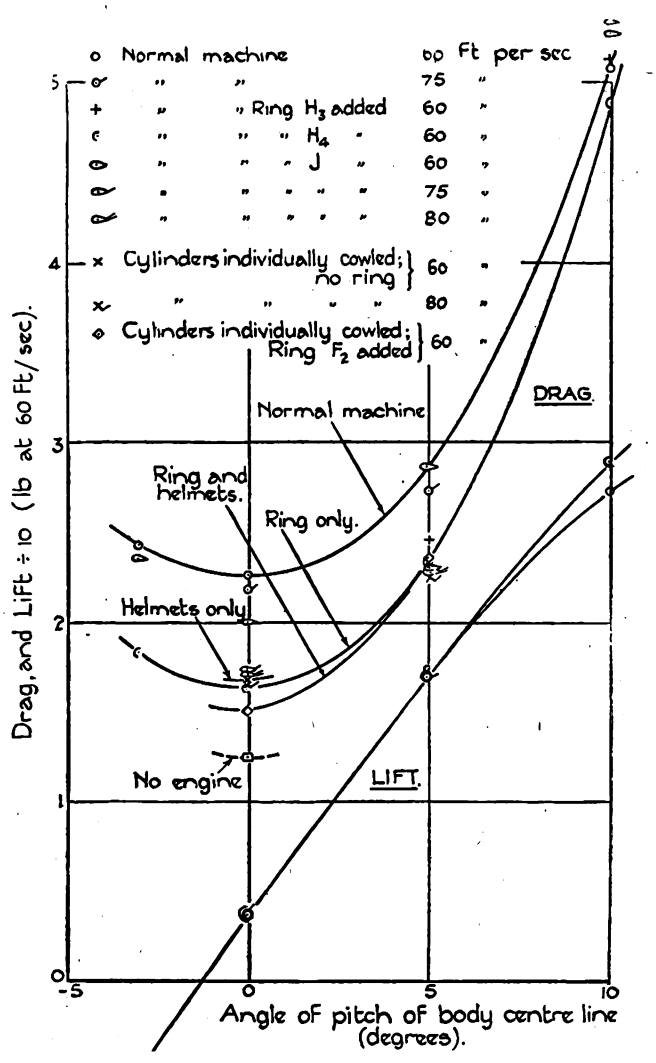
The number of heat units per h.p. that have to be transferred to the cooling air does not depend much upon the arrangement of the cylinders. The first successful aircooled engine was the rotary 50 h.p. Gnome of 1909, which depended more on its speed of rotation than the forward speed of the aircraft for cooling. The cowling used in those early days was to keep the oil from blinding the pilot rather than to reduce drag.



Above is a cambered ring for the Jupiter engine made as a polygon to simplify wind-tunnel tests.



Below is shown a thick section ring for use as an exhaust collector and faired into the valve casings. Between the valve covers and the ring of the latter model will be seen fillets which were made of plasticine. These had quite a marked effect in correcting a tendency to stall caused by the unstreamlined casings.



The lift and drag, uncorrected, for tunnel wall effect for various rings on the quarter scale model of the Short Crusader.

The early air-cooled Vee-engines were cooled by fans but as the speed of the aircraft was increased the fans become unnecessary and improved forms of cowling were used to give the necessary cooling.

Radial air-cooled engines were developed at the same time as the rotary but met with little success because of the poor cooling obtained with the slow forward speeds. When aircraft speeds became considerably higher and improved aluminium alloys were used for better designed cylinder-heads the radial engine came into its own.

[One questions the complete accuracy of these statements. The Anzani was a good engine but was unreliable rather because of poor workmanship and material. The Viale was good but was never adequately financed. And surely Major Green cannot seriously consider the drag of an air-cooled engine as any kind of measure of the h.p. which is needed to cool it when the cooling is done intelligently instead of by merely sticking the cylinders out in the air to look after themselves.—ED.]

A number of tests were made in the 5 ft. by 4 ft. wind-tunnel at the Armstrong Whitworth Aircraft Works and showed the drag of a Jaguar engine by itself at 100 ft. per sec. to be between 70 and 80 lbs. The drag of a typical two-seat aircraft without windscreens is about 20 lbs. If the engine is placed in front of this body without any fairing the drag becomes 55 lbs.

In 1919 this was investigated by the R.A.E., who suggested a cowling very similar to that now known as the N.A.C.A. type. Because of the difficulties of allowing for adequate cooling and making in full scale the very large number of modifications that would be necessary, the scheme was not followed up.

In 1925 a Siskin with a totally encowled Jaguar was tested. The top speed of the aircraft was increased by 4 to 5 m.p.h. which corresponded to a reduction of total drag

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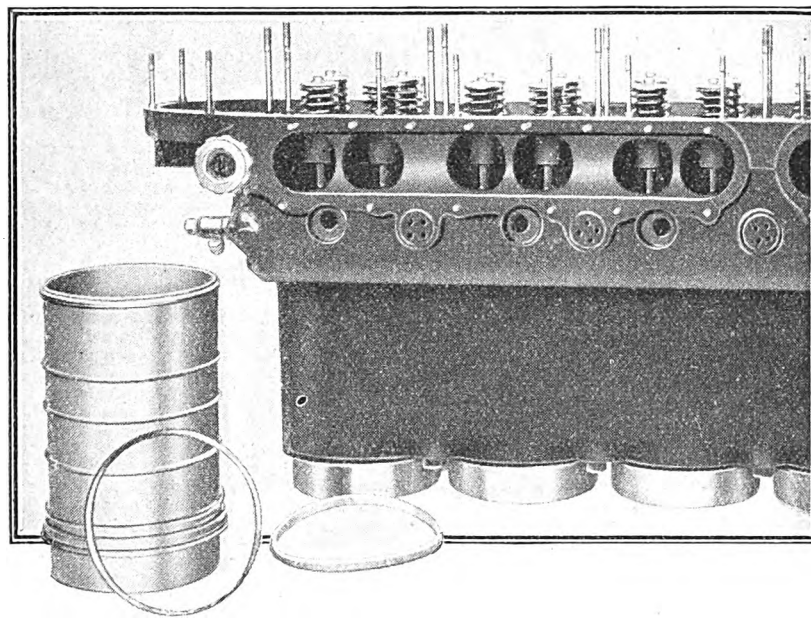

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THE LATEST.—The Townend ring in its latest form on an Avro Avian with the Armstrong Siddeley Genet-Major engine.

the Guggenheim competition. The ring made it fast enough for one condition, whereas the slots. . . . Boulton and Paul's experience of the ring was with engines mounted in nacelles, and they had found that rings which were favourable at low angles of lift were not good at larger angles.

Another thing they had found was that the rings had to be of different proportions. The chord of a ring which was all right for the engine in the nose of the fuselage had to be increased for wing nacelles. This increase in chord however was critical and if increased beyond a certain amount lost its value. Unlike Major Green they had found that rounding the corners behind the engine still further reduced the drag.

He agreed that there was no change in cooling with the ring. They had not found a satisfactory ring for use in front as an exhaust collector. They had found that the eighteen pipes on a nine cylinder radial did not make any difference one way or another, but the way these rings were attached to the collector ring, which was well in front of the Townend Ring, did matter. What you did underneath the ring did not have much effect.

He thought that results obtained with the Crusader were surprising in that the drag was decreased by fitting the ring over the helmets.

When he was in America he discussed the ring with the N.A.C.A. people and found that they had developed their cowling from a different set of ideas and were interested in Mr. Townend's theories.

He said that the increase of 17 miles an hour gained by the N.A.C.A. cowling on one type of machine was due to reduction of induced drag and increased airscrew efficiency. [The reference here is to the Lockheed cabin monoplane, the speed of which was put up from a little over 150 m.p.h. to a little under 170 m.p.h.—Ed.]

Mr. Siddeley said that as a constructor and manufacturer of radial engines he had always felt that one day these engines could be flown as fast as any other type, and he congratulated Mr. Townend on inventing this means of making his (Mr. Siddeley's) idea become a fact. It was common knowledge that aircraft with a standard type of engine made by his firm had a top speed of over 200 m.p.h.

Mr. Reynolds, who was responsible for a large amount of the work in developing the ring for the Armstrong Siddeley engines, acknowledged the great help he had received from Mr. Townend. He said that bodies of different shapes need different rings. They have, however, tackled the problem from the commercial aspect and have boiled all the different types down to two rings neither of which is too bad. They have developed a stream-lined exhaust-collector for use behind the ring and this does not disturb the airflow. He had noticed that the ring smooths out the flow round the fuselage and this is very noticeable from the rear cockpit. They have found some difficulty in attaching the ring to the engine. They have been able to prevent vibration by applying a certain amount of damping.

Dr. Steenmar said that in Holland they had made tests of the Townend Ring with four different types of aircraft. The speed of a single-seat fighter with a Jaguar had been increased at ground level by ten per cent. yet at 15,000 feet the results were not so good. He thought they should be better. A two-seat machine had formerly a Hispano Suiza engine which was replaced by a radial. When a ring was fitted to this type there was no increase in speed but the machine was much smoother to handle.

Mr. Davenport of the Westland Aircraft Works said that the ring when placed on the Wapiti with a Jaguar gave all the results which were claimed. His own firm had been endeavouring to produce a ring for a nine-cylinder radial which would also be an exhaust-collector. In the wind-tunnel a ring placed in front of the cylinders, which were helmeted, and faired into them, reduced the increased drag due to the engine by 70 per cent. and had increasd the speed by 5 per cent. In their early results they had produced a ring in the shape of an exhaust collector which gave neither improved nor lessened performance.

Mr. Relf, Superintendent of the Aerodynamics Department of the N.P.L., said that Mr. Townend had done his work well. Not only had he supplied an invention but he had supplied an explanation of how it worked. When he was told about it he thought that there might be a big scale-effect. He explained that a radial engine, although in the nose of the fuselage where the airflow is not susceptible to interference, did manage to upset the flow considerably and the function of the ring was to force the interrupted flow back onto the fuselage.

Mr. W. S. Farren said that if Mr. Townend could do so much from a hint, we might expect great things from him in the future. He thought that perhaps the practical adaptation of the ring had followed so quickly because of its simplicity and the fact that it was obvious that the cooling would not be adversely affected. [Personally one is amazed at the length of time taken to develop the ring and at how little had been heard about it till the booming of the N.A.C.A. cowling brought the ring into the open and showed that it was actually thought of before the N.A.C.A. cowling.—Ed.]

He explained that the reason why the complete cowling developed at the R.A.E. in 1919 had not been followed up was because cooling was the critical feature and without a wind-tunnel of adequate size the making of tests for such development was not possible. This was the reason why the N.A.C.A. had been able to produce their cowling. He hoped that this lesson would be driven home and that those responsible would sanction the building of a large-diameter tunnel in this country which tests could be made with the engine running.

We are now discovering that air can be made to go where wanted if it is pushed there. He did not wish to trespass on the property of Mr. Handley Page but he suggested that the application of the principle of this device might be used to improve the effects of the controls at the tail. He explained how the air was made to turn corners nicely in the Gottingen type of tunnel by placing suitable arranged aerofoils in the bends. [Much better make fuselages the right shape to begin with,—which very few are,—than start sticking plates and deflectors and rings all over them.—Ed.]

Dr. Thurston welcomed the paper as another proof that "rider" planes can be used to alter characteristics of any body. He showed some slides giving results he had obtained from wind-tunnel tests on a model of a cylinder with a "rider" plane placed parallel to its axis and some distance from the surface. These results show a very large increase in the lift and decrease of drag of the combination when the cylinder is rotated through 90 deg. and the "rider" plane is completely in front of the cylinder. Dr. Thurston suggested that such a device could be used to decrease the drag of wheels.

He showed some slides of birds which illustrated the way in which the alula wing is used. There was a remarkable picture of a flight of geese coming in to land, and a picture of a kittiwake gull making a climbing turn with one alula opened and the other shut.

Another Speaker agreed that the Townend ring gained from its simplicity. He said that his firm had used a duralumin ring which had stood up well and that they had found improved results from increase of chord. They found that results were not affected by small alterations of angle. They made their tests on a machine with small fuselage and big engine. The streamers which they had attached to the fuselage showed the turbulence quite clearly and how this was smoothed out by fitting the ring

Another Speaker asked whether any difference in cooling had been noticed when the ring was fitted in double- and single-banked engines. The double-banked engine should be all right, but he noticed that the Americans with the N.A.C.A. cowling and single-banked engines had had to use deflectors to make the air go to the back of the cylinders. Could the ring be applied to radiators thereby decreasing drag and improving the airscrew efficiency by reducing the airscrew body interference.

Mr. H. B. Irving said that at first they (at the N.P.L.) thought the towing effect of the ring could be used for mooring airships. He asked for definite evidence as to the increased ceiling obtained with the Boulton and Paul machine as he found this difficult to understand. [Well! Surely if you decrease the drag of a machine it has that much more power—and speed—with which to go on climbing.—Ed.] He thought that care should be taken to keep the weight of the ring down as its position with regard to the C.G. might tend to keep a machine in a spin. [The *side-area* of a ring so far forward might give a machine a tendency to spin, but the *weight* so far forward ought to help to make it come out of a spin. Has Mr. Irving been mis-reported, or does he know little about aeroplanes?—Ed.]

The Replies.

Mr. Townend, replying, agreed that you could take liberties inside the ring which could not be taken without it. The question of a spinner is a case in point, as a spinner with a ring makes no difference. He agreed with Dr. Steenmar that each case must be tested on its merits.

The ring although reducing the speed of the airflow past the cylinders improves the cooling by altering the air flow from oblique to straight. He had tried to reduce the drag of a cylinder and had not succeeded. Had Dr. Thurston been able with his "rider" plane to reduce the total drag to a figure below that for the cylinder alone? He agreed that the angle of incidence of the ring was not critical. A ring round the radiator might decrease the drag but it might also decrease the cooling. [One believes that, on the contrary, it would improve it by increasing the air-speed through the tubes near the edges of the radiator.—Ed.]

Major Green, replying, said he was very pleased to learn of the results obtained in Holland but he thought that a ten per cent. increase in speed was very high and suggested that some difference in throttle setting might account for this. He was interested to learn of the successful results being obtained by Mr. Davenport but suggested that an exhaust-collector ring in front threw a lot of heat on the cylinder-heads which was not good. Cooling with the ring was always good. His Works Manager had bet him £5 that a duralumin ring would not stand up. He did not think that there was any difference in cooling with the ring on single- or double-banked engines.

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THE LIGHT AEROPLANE
AND THE FLYING CLUBS.

FROM THE CINQUE PORTS CLUB.

The following remarks come from the Secretary of the Cinque Ports Club:—

THE AEROPLANE newspaper in its issue of Mar. 5 published some very interesting statistics on the work of the Clubs and Schools during the year 1929. Of course it is well known that figures can be made to prove most things, but no one will deny that the best criterion of the efficiency of any flying school or club consists of the net figure showing the amount of work extracted from the equipment in use.

Looking at THE AEROPLANE's figures from this point of view, and taking only the subsidised clubs, we are pleased to find that out of twelve clubs whose figures were published the Cinque Ports flying Club put up the second best performance—being only beaten by the London Aeroplane Club. The equipment of the London Aeroplane Club consisted of six Moths, and we find that each of their six Moths flew, on an average, five hours more than each of our two Moths during the year.

We find, however, that we beat London on another count, in that, leaving out the time flown by qualified pilots and in the course of tests and joy-riding, the London Club's aircraft flew 27 hours 40 minutes on dual instruction for each "A" licence obtained, whereas our aircraft only flew 27 hours 5 minutes dual for each "A" licence obtained.

[The Club has every reason to be proud of this record, especially as it is a comparative newcomer compared with other clubs who published figures, and has consequently had less time to work up to a maximum of efficiency.—ED.]

THE KENYA TOUR.

The following letter is of considerable interest:—

Sir,—On looking through all the back numbers of THE AEROPLANE which I had missed from Jan. 1, I came across one reference to Capt. Guest's recent expedition in Africa, that in your issue of Jan. 22, under the heading "Kenya and Back." The impression left by this note strikes me as being unfair and requiring some qualification. There was no question of Capt. Guest being "unlucky in his choice of country." Apart from the sporting motives which induced him, at considerable expense, to take out the expedition, there was also the deliberate object of seeing how National Flying Services principles could be applied to East Africa.

Whether or not it has all been explored thoroughly by others, surely he has done a service to aviation and collected much information which could have been obtained in no other way but at first hand.

As to the "unfortunate remark" to which reference is made on this and past occasions. Without wishing in any way to prolong the subject, everybody knows there were grounds for an imputation, obviously not meant to be applicable to everybody, and only the occasional habit of the press of twisting things to serve its own ends made the remark appear "unfortunate."

I need only add as regards this that the relations between our expedition and all the flying and non-flying fraternity of Kenya were the best possible, and we have only the happiest recollections of our tour.

As to the expedition itself and the work done,—the three Moths piloted by Capt. Guest, Miss Spooner, Mr. Hordern and myself each completed about 110 hours' useful flying between Nov. 5 and Jan. 15, covering Kenya, Tanganjika, Northern and Southern Rhodesia and the Transvaal. Landings were made at many places where aeroplanes had never been seen before and in some places where they are hardly likely to be seen again.

The greater amount of the flying was done during the short rainy season, under conditions frequently anything but congenial.

On January 16 the expedition started from Nairobi for home via the Nile, the N. African Coast, Tunis and Italy. The journey took 92 hours' flying and the three Moths kept together practically throughout, and only an unfortunate bout of malaria which attacked our lady pilot prevented the arrival in formation at Hanworth of the three machines on the prescribed day.

Thus 200 hours were put up by each machine in 4½ months, and apart from being, I believe, the first formation of civil aircraft to do a trip of this nature, in my opinion Capt. Guest's enterprise deserves recognition as an example of ease and 100% reliability of touring in the modern light aeroplane.

Careful record was kept of fuel supplies, landing fees, and incidental expenses, and these alone when compiled should prove of interest and value to others contemplating similar tours abroad.

All this is not to ask for bouquets, but to protest mildly against what one might describe as your somewhat derogatory allusions to a quite valuable enterprise.

(Signed) R. CHEVALLIER PRESTON, Flight Lieut.

[At any rate it was an excellent demonstration of what Moths can do.—ED.]

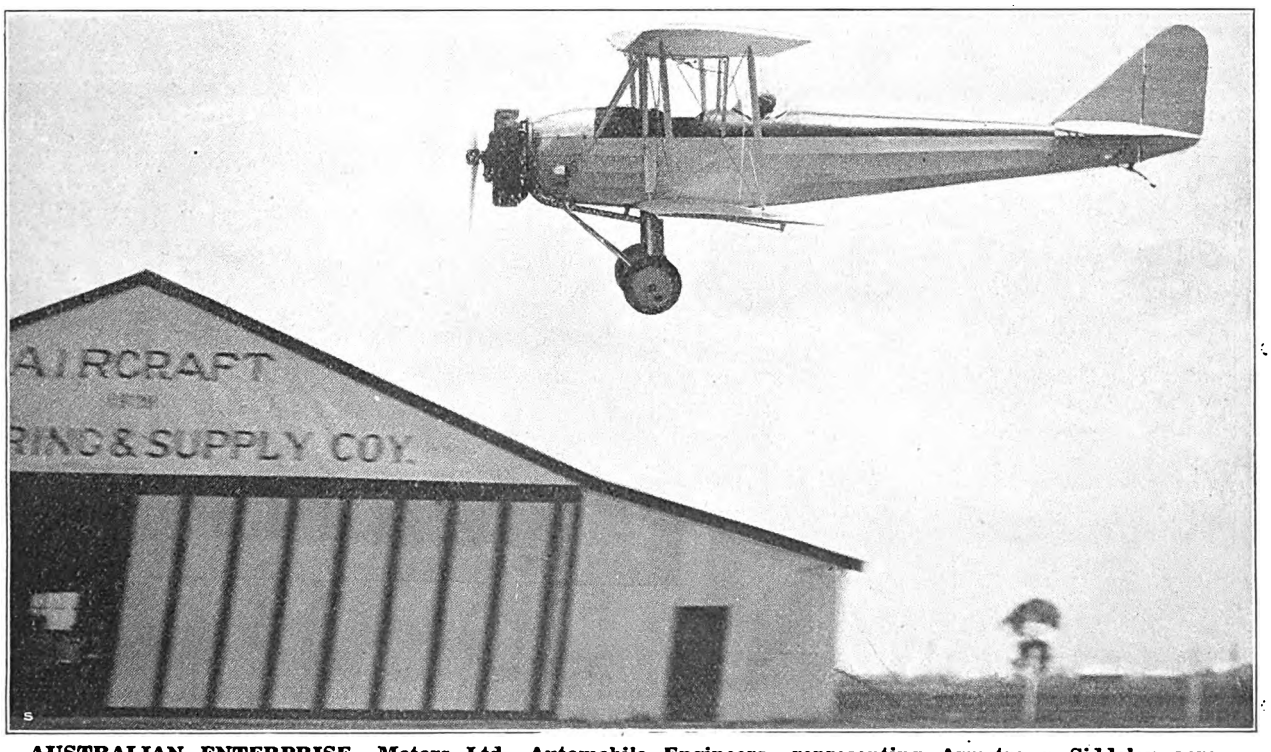
THE BROOKLANDS SCHOOL.

Owing to some misconception an impression was given in an article recently on the At Home given by the Brooklands School of Flying Ltd. that Captain H. Duncan Davis, the Managing Director of the firm, is the Proprietor. As a matter of fact, although Capt. Davis started the School himself the actual capital was subscribed by a number of the pupils. There is particular interest in noting the fact that every shareholder in the firm is a qualified pilot. Probably in this matter the firm is unique, if one excepts limited companies which are owned by perhaps two or three qualified pilots as private concerns.

NO ACCOUNTING FOR TASTES.

Mr. J. G. (Tex) Rankin is credited with having made nineteen outside loops in a Great Lakes Training Plane over Portland, Oregon, Airport on Jan. 7, 1930.

The machine was fitted with an 85 h.p. Cirrus engine.



AUSTRALIAN ENTERPRISE.—Motors Ltd., Automobile Engineers, representing Armstrong Siddeley aero-engines for aircraft and Rolls-Royce cars in Adelaide, send the photograph shown above of one of the latest Avians (Armstrong Siddeley Genet, with Townend ring) under test at the Parafield Aerodrome, Adelaide. Motors Ltd. are the first motor agency in South Australia to undertake the distribution of aircraft. The machine is shown over the sheds of the Aircraft Manufacturing and Supply Co. The angle of the shed is not caused by the Australian climate, which is noted for its high winds, but merely by the swing of the camera.

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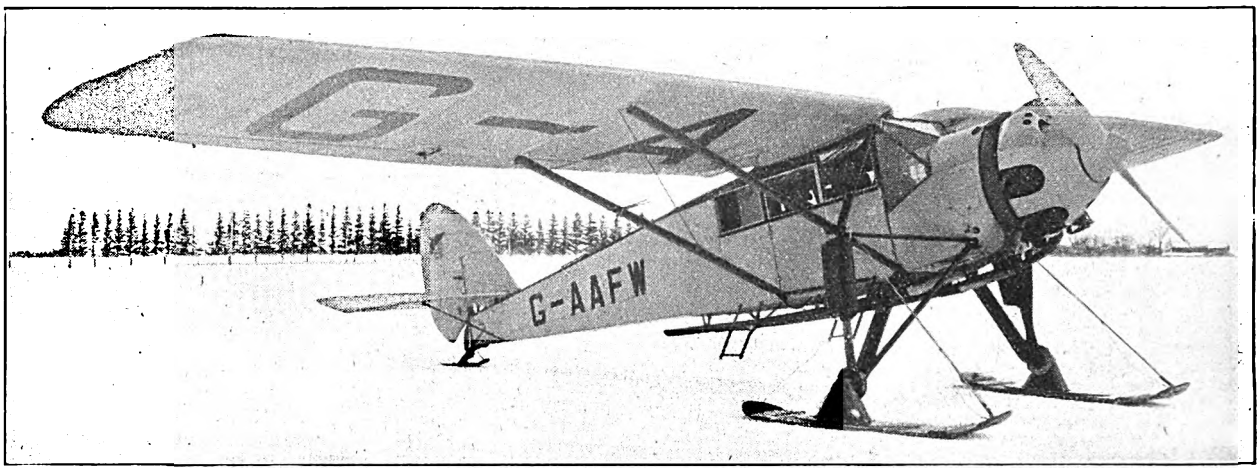
THE MOTH SIX.



IN CANADA.—A D.H. Moth Six six-seat cabin monoplane (Armstrong Siddeley geared Lynx engine) on skis.

The De Havilland Aircraft Co. Ltd. is now going into production with the Moth Six, a four, or occasional six, seat cabin monoplane with either the 240 h.p. Armstrong Siddeley geared Lynx or the 300 h.p. Wright Whirlwind (J-6) radial air-cooled engine.

The Moth Six is the ultimate development of the Hawk-Moth, which has undergone a long period of development since its first appearance some eighteen months ago. In general arrangement and outward appearance there is little difference between the two types but several modifications have been introduced as the result of experience.

The Moth Six belongs to a class of aeroplane which is comparatively scarce in this country. Although in one of its forms it can be produced as a luxurious private owner's machine of the more expensive type, it is primarily intended as a small commercial aircraft for use as an air-taxi, as a light passenger carrier for air-line "feeder" routes or on routes which do not justify the use of big multi-engined aircraft.

The De Havilland Company has shown considerable foresight in producing a machine to fill the gap between the big commercial type and the small two-seater light aeroplane. In order to assure themselves that the Moth Six will fulfil the requirements of the general aircraft operator all over the World, they have sent specimens to their associated companies in Canada and Australia so that they may be flown under local conditions by intending buyers and demonstrated to all who may be interested. Another advantage of this enterprise is that modifications suggested in the light of local requirements and conditions may be incorporated in subsequent production machines.

The Hawk-Moth was exhibited at the 1929 Aero Show at Olympia and was fully described at the time. The construction of the Moth Six is identical to the Hawk-Moth so that it will not be necessary to give more than a very brief description of the new type.

The fuselage is a steel tube structure in two main sections and is covered with fabric. The forward section is built up of rectangular tubes assembled with flat plate-fittings. In the rear section the sides are complete units of square longerons and round tube vertical members with welded joints reinforced by steel plates. These are built up in jigs on the flat and when erected are joined together with round cross-tubes, the ends of which are pinched or flattened for attachment to the welded-in plate fittings. The side units are rigidly braced by cross tubes but the transverse bays are braced with wires and turnbuckles.

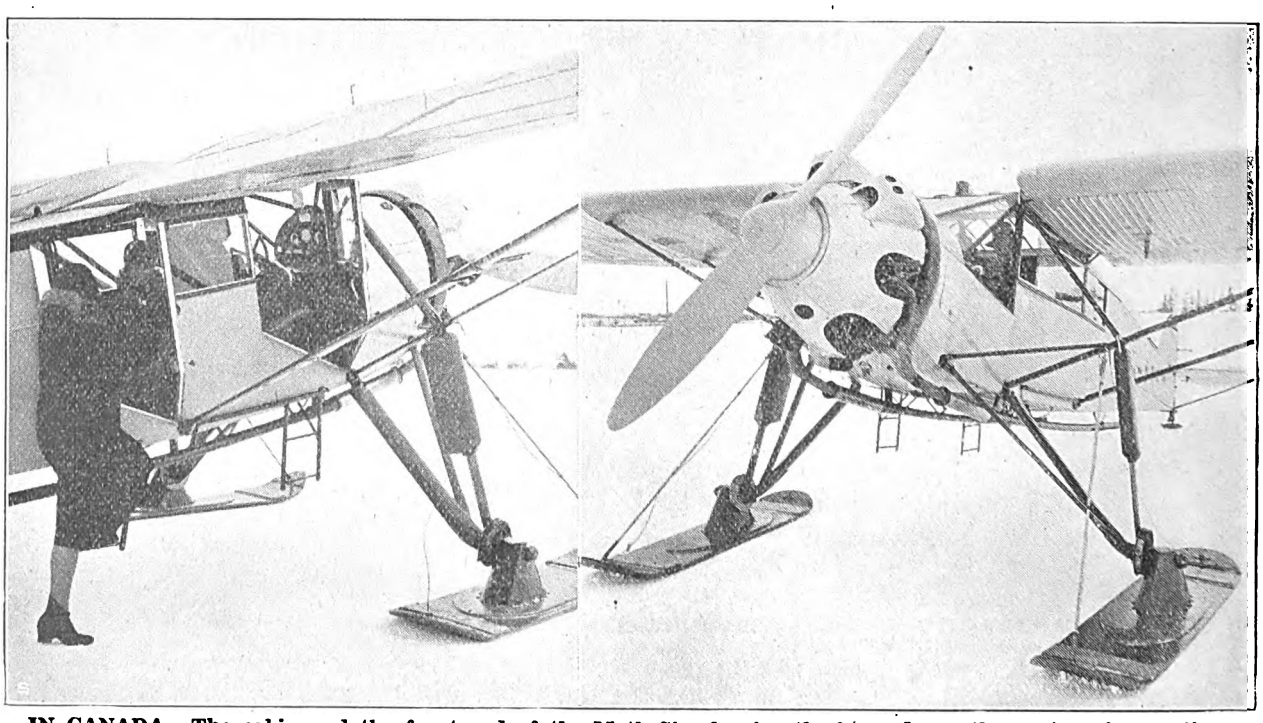
The engine mounting is also of square steel tubes and can be removed by undoing four bolts.

The wings are of wooden construction. In the Moth Six the chord has been increased by 16 inches and the wing section has been modified to decrease the take-off run and improve the angle of climb.

The spars are tapered and have spruce flanges and plywood webs. The plywood web is complete on the rear face of each spar but on the front faces the web is only used in certain places. A plywood leading edge extends back to the front spar above and below so that actually the wing back to the spar is one unit forming a very strong and indeformable "D" spar. The ribs are of normal D.H. type.

The aileron framework is a welded steel-tube structure and the ailerons, as with the wings, are covered with fabric.

The wings are attached to the top fuselage longerons and are rigidly-braced to the bottom of the fuselage by stream-



IN CANADA.—The cabin and the front end of the Moth Six showing the large doors, the neat engine cowling and the ski equipment.

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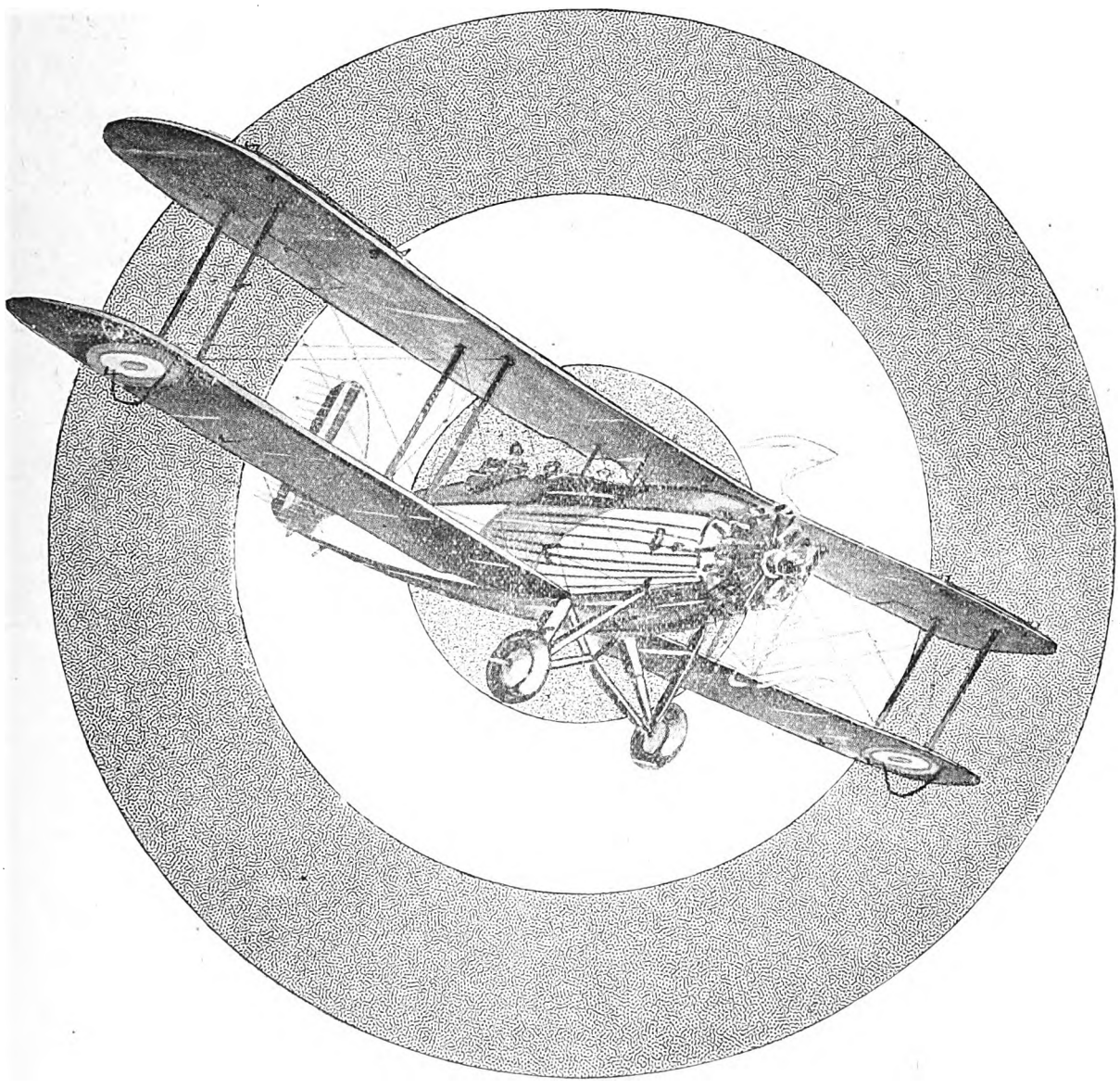
THE WESTLAND WAPITI



THE standard General Purpose two-seater used by the Royal Air Force, R.A.A.F. and S.A.A.F. For wireless, reconnaissance, bombing, photography, desert patrol, and advanced training. Fitted with Jupiter VIII or Jaguar Engine, slots, and straight or split-axle land undercarriage, floats or skis. All-metal or composite wood and metal construction.

DESIGNED AND CONSTRUCTED BY

WESTLAND AIRCRAFT WORKS

(Branch of Petters Limited),

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line steel tube struts. The front bracing struts are attached to the apices of two pyramids which are built integral with the sides of the fuselage. The rear struts are hinged direct to the bottom fuselage longerons.

The wings are arranged to fold round the rear-spar fittings and for folding purposes the front bracing struts are detached at their lower ends and are swung back to fittings on the rear bracing struts. A telescopic jury-strut is provided to support the front spars of the wings when folded and to take the weight of the wing fuel tanks.

The undercarriage is of the divided type and consists of two legs with rubber-in-compression springing, the upper ends of which are anchored to the apices of the pyramids already mentioned and the lower ends hinged to the bottom fuselage longerons by two bent steel tube axles and two radius rods. Dunlop wheels and wheel-brakes are fitted.

A steerable tail wheel is hinged to the rudder post and is interconnected by cables with the rudder controls.

The tail-unit is of welded steel tubes throughout and is an exact duplicate to that fitted to the Hawk-Moth.

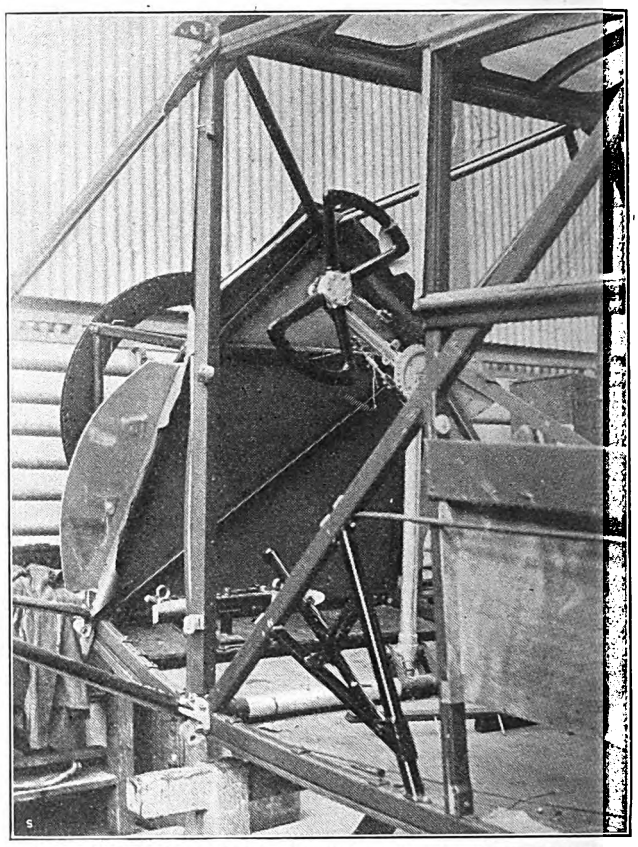
The principal modifications to the type as exemplified in the Moth Six is in the accommodation.

The cabin is now arranged so that it can accommodate a pilot and five passengers. The two front seats are fixed and the pilot is located on the left.

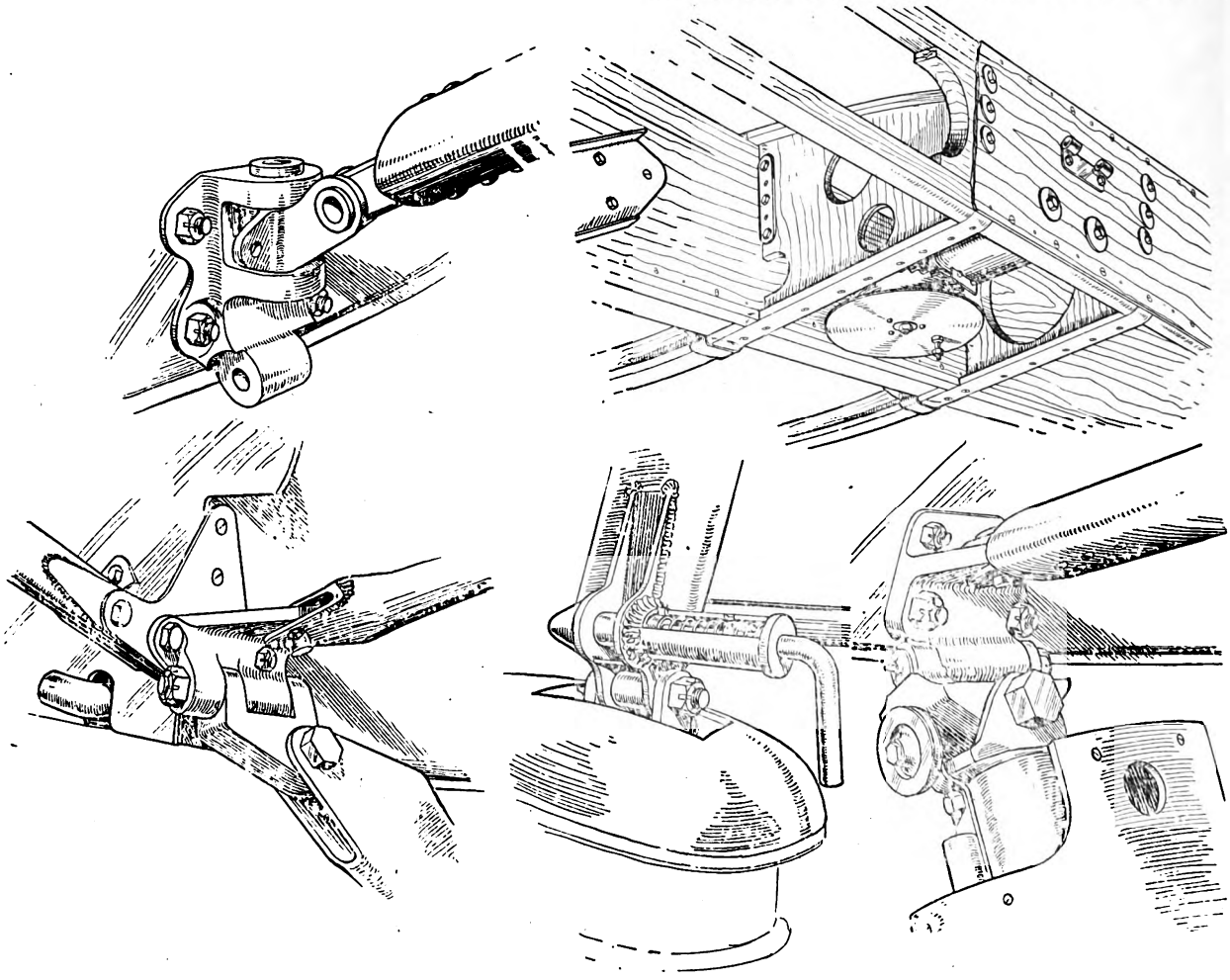
The control column is centrally placed and its top half is hinged so that it can be swung in front of either seat. The control is in the form of two segments of a wheel, the lateral control being transmitted to the rigid section of the control column by chain and two sprockets. This is clearly shown in the attached photograph. Normal rudder bars are now fitted and these are unencumbered with wheel-brake gear.

The wheel brake lever and the tail adjusting lever are on the left side of the pilot. The centrally-placed control column obviates any obstruction between the pilot's legs and allows freedom of movement and ease of access.

All controls are of the rigid type, are mounted on ball bearings and all joints are provided with dust-excluding caps so that except for periodical greasing they require practically no attention. Aileron controls are of the D.H. differential type and the elevator control has a varying



The cabin of the Moth Six under construction, showing the new type of control column.—(*"Aeroplane" photograph.*)



THE MOTH SIX.—Some constructional details. Above: On the left the rear wing bracing strut attachment to the fuselage and on the right the differential aileron control operating disc. Below: On the left, the undercarriage radius rod universal joint to the fuselage; in the middle, the attachment of the main undercarriage leg to the fuselage pyramid, and on the right, the axle and wing bracing fitting on the fuselage.

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LA FÉDÉRATION AÉRONAUTIQUE INTERNATIONALE
HAVE GRANTED THE FOLLOWING

WORLD'S RECORDS

GREATEST SPEED OVER
100 KILOMETRES.

FLYING OFFICER H. R. D. WAGHORN,
ON
SUPERMARINE
ROLLS-ROYCE S.6
7th SEPT., 1929.
330.1 M.P.H. 531.200 K.P.H.

FLYING OFFICER R. L. R. ATCHERLEY
ON
SUPERMARINE
ROLLS-ROYCE S.6
7th SEPT., 1929,
331.6 M.P.H.
533.800 K.P.H.

SUPERMARINE

WORLD'S GREATEST SPEED

SQUADRON LDR. A. H. ORLEBAR, A.F.C.
ON
SUPERMARINE
ROLLS-ROYCE S.6
12th SEPT., 1929,
357.7 M.P.H. 575.700 K.P.H.

A REMARKABLE TRIBUTE TO THE RELIABILITY OF THE DESIGN AND CONSTRUCTION OF AIRCRAFT BUILT BY

THE SUPERMARINE AVIATION WORKS, Ltd.,
Proprietors: VICKERS (AVIATION) LIMITED,
SOUTHAMPTON.

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leverage which gives an increased travel in the upward direction and provides the maximum effect near the stall.

Behind the front seats are two emergency seats which, when the machine is required as a four-seater, form a luggage space. The back of this seat, which runs right across the cabin, folds to form a table or shelf. At the rear of the cabin are two more seats and behind them is sufficient room to store further baggage.

Three doors are fitted to the cabin, two forward, one on either side of the pilot's seat and one aft, on the port side, leading to the rear seats. Windows are provided throughout the length of the cabin and these are openable.

The roof is covered with transparent panels which in addition to lighting the cabin provide the essential view upwards and backwards which so many enclosed aircraft lack.

The front windows slope down from the roof to the engine bulkhead and their arrangement together with the narrowing of the fuselage forward of the cabin provide an excellent view forward.

The engine normally to be fitted will be the 240 h.p. Armstrong Siddeley geared Lynx, but a 300 h.p. Wright J-6 engine is to be installed in one of the machines now under construction.

The Lynx engine is very neatly cowled in. The exhaust collector ring forms part of the cowling aft of the engine and long tail pipes take the exhaust noises and fumes back under the fuselage to a point aft of the cabin.

The main fuel tanks are located in the wings and two different sets of tanks may be provided. Small tanks with a total capacity of 35 gallons will give a range of 280 miles and big tanks holding 70 gallons will give a range of 560 miles. The oil tank of 9 gallons capacity is mounted in front of the fireproof bulkhead.

Throughout the machine there is evidence that every possible effort has been made to provide a machine that will be easy to operate, cheap to maintain and one that will give good service under all the many conditions which a machine of this class may be called upon to serve.

The following are the weights and performances of the Moth Six with the Armstrong Siddeley geared Lynx and the Wright J-6 engines.

With the 240 h.p. Armstrong Siddeley Lynx Engine:

Landplane (560 miles' range).—Weight empty 2,380 lbs. (1,080.5 kgs.), Petrol and oil 626 lbs (284.2 kgs.) Pilot and pay load 644 lbs. (292.3 kgs.), Weight loaded 3,650 lbs. (1,657 kgs.).

Landplane (280 miles' range).—Weight empty 2,380 lbs (1,080.5 kgs.), Petrol and oil 357 lbs. (162 kgs.), Pilot and pay load 913 lbs. (414.5 kgs.), Weight loaded 3,650 lbs. (1,657 kgs.).

Seaplane (540 miles' range).—Weight empty 2,653 lbs. (1,204.5 kgs.), Petrol and oil 626 lbs. (284.2 kgs.), Pilot and pay load 521 lbs. (236.5 kgs.), Weight loaded 3,800 lbs. (1,725.2 kgs.).

Seaplane (270 miles' range).—Weight empty 2,653 lbs. (1,204.5 kgs.), Petrol and oil 357 lbs. (162 kgs.), Pilot and pay load 790 lbs. (358.7 kgs.), Weight loaded 3,800 lbs. (1,725.2 kgs.).

Performance (Landplane—3,650 lbs. (1,657 kgs.)).—Speed, max., 127 m.p.h. (203.2 km.p.h.), Cruising speed at 1,000 ft. (305 m.) 105 m.p.h. (168 km.p.h.), Speed at 5,000 ft. (1,525 m.) 120 m.p.h. (192 km.p.h.), Speed at 10,000 ft. (3,050 m.) 113 m.p.h. (180 km.p.h.). Stalling speed 54 m.p.h. (86.4 km.p.h.), Initial rate of climb 710 ft./min. (216 m./min.), Climb to 5,000 ft. 8.5 min., Climb to 10,000 ft. 21.5 min., Absolute ceiling 17,000 ft. (5,185 m.), Service ceiling 14,500 ft. (4,420 m.).

Performance (Seaplane—3,800 lbs. (1,725 kgs.)). — Speed, max., 123.5 m.p.h. (197.6 km.p.h.), Cruising speed at 1,000 ft. 100 m.p.h. (160 km.p.h.), Speed at 5,000 ft. 116.5 m.p.h. (186.4 km.p.h.), Speed at 10,000 ft. 107 m.p.h. (171.2 km.p.h.), Initial rate of climb 620 ft./min. (190 m./min.), Climb to 5,000 ft. 10 min., Climb to 10,000 ft. 28 min., Absolute ceiling 14,500 ft. (4,420 m.), Service ceiling 12,000 ft. (3,660 m.).

With the 300 h.p. Wright Whirlwind J-6 Engine:

Weight of pilot and pay load (560 miles' range) 794 lbs. (360 kgs.), Pilot and pay load (280 miles' range) 1,063 lbs. (483 kgs.), Weight loaded 3,800 lbs. (1,725.2 kgs.).

Performance (Landplane—3,800 lbs. (1,725.2 kgs.)).—Speed, max., 131 m.p.h. (209.6 km.p.h.), Cruising speed at 1,000 ft. 109 m.p.h. (174.4 km.p.h.), Speed at 5,000 ft. 124 m.p.h. (198.4 km.p.h.), Speed at 10,000 ft. 115 m.p.h. (184 km.p.h.), Stalling speed 55 m.p.h. (88 km.p.h.), Initial rate of climb 790 ft./min. (240 m./min.), Climb to 5,000 ft. 7.5 min., Climb to 10,000 ft. 17.5 min., Absolute ceiling 17,500 ft. (5,340 m.), Service ceiling 15,000 ft. (4,575 m.).

Performance (Seaplane—3,800 lbs. (1,752.2 kgs.)).—Speed, max., 128 m.p.h. (204.8 km.p.h.), Cruising speed at 1,000 ft. 105 m.p.h. (168 km.p.h.), Speed at 5,000 ft. 121 m.p.h. (193.6 km.p.h.), Speed at 10,000 ft. 112 m.p.h. (179.2 km.p.h.), Stalling speed 54 m.p.h. (86.4 km.p.h.), Initial rate of climb 760 ft./min. (232 m./min.), Climb to 5,000 ft. 8.5 min., Climb to 10,000 ft. 21.5 min., Absolute ceiling 15,500 ft. (4,725 m.), Service ceiling 13,500 ft. (4,120 m.).

A WIDGEON FLIES TO WINNIPEG.

A correspondent in Winnipeg writes:—

In response to a wire from Fargo, North Dakota, a bunch of us went out to Stevenson Field at 5 p.m., and at ten minutes past Mike de Blicquy and his Hermes-Widgeon dived out of a 20-below-zero sky at 125 m.p.h. and turned in a most classic landing to finish his 2,250-mile jaunt from New York.

He was a cold lad. His wife, feeling that some connubial demonstration was called for, advanced to the side of the fuselage and was promptly saluted by a leather gargoyle with half an inch of ice round his mouth. One of his fingers was touched with frost, but on the whole he had come through seven hours of flying since morning at temperatures all the way from 10 to 25 below zero, remarkably well. The Widgeon had only a racing windshield, too.

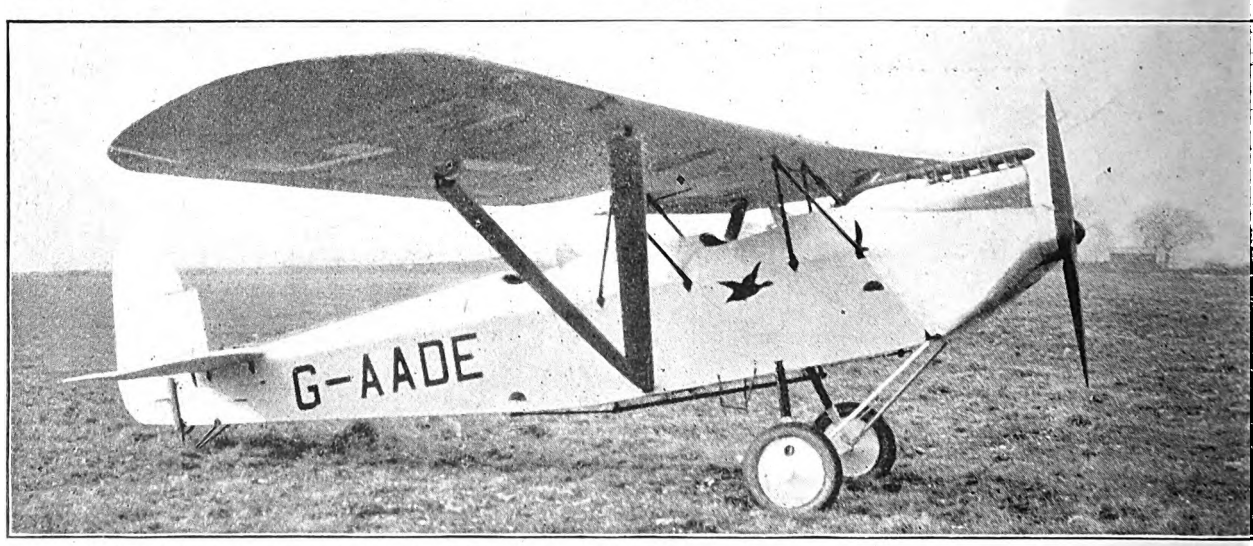
Mike was sent to Farmingdale by President P. F. Osler of Aero Marine Ltd. of Winnipeg. The Widgeon was picked out as the most promising thing in sight for Canadian commercial light-plane duties.

A cabin job is poor for instruction, they say, and I certainly see reason in the contention that the feel of the air is a much longer business to acquire from inside a cabin. Sideslipping is dangerous or useful, according to circumstance, and I can't see how a student will get it brought home to him as fast without a good wind on his cheek when he transgresses.

The weather down South has been the same as here but rougher. Old timers admit they don't remember anything quite so cold or incorrigibly stormy this long. Air-lines cancelled their schedules day after day, and the U.S. Army "Arctic Patrol" got scattered all over half a dozen States, from which they were collected in time to proceed on their journey. Mike used his emergency tank once only in about ten hops, the remainder of them concluding when he was forced down by fog, storms and blizzards.

He is full of enthusiasm for the Widgeon and its behaviour, and is agreeably surprised that the Hermes functions so well and consistently in this weather, which it meets, I gather, for the first time. In fact, there was no trouble other than from the elements in the whole trip.

I suppose one should include the dishonest elements of the population in the category, for his bag with laundry, helmet, goggles, papers, etc., were lifted at one of his stops, and being in too much of a hurry to get funds wired down to him he pawned the spare prop of his Widgeon for a new helmet and goggles.



A LIGHT MONOPLANE.—A Westland Widgeon (D.H. Gipsy engine) of a type, except for the engine, similar to that used in the flight from New York to Winnipeg described above.

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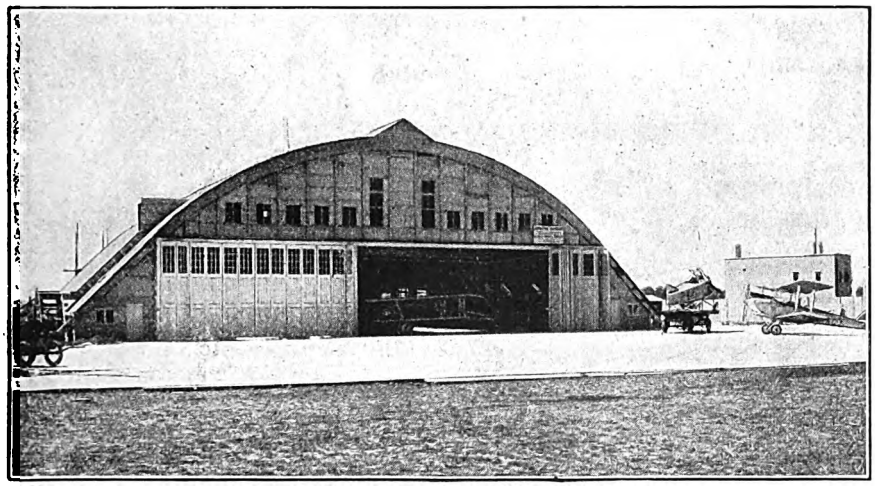
ESAVIAN

FOLDING & SLIDING DOORS

FOR THE MODERN AEROPLANE HANGAR



HANGAR AT HESTON AERODROME ENCLOSED WITH ESAVIAN DOORS 100 FEET LONG BY 19 FEET 6 INCHES HIGH, FITTED WITH SPECIAL WINDING GEAR.

Associated Architects: Murrell & Pigott, FF.R.I.B.A., and L. M. Austin, A.R.I.B.A.

The increasing size of modern aircraft necessitates Hangar openings not less than 100 ft. in width and from 20 feet to 30 feet in height—large entrances which clearly demand Esavian Folding and Sliding Doors.

Esavian Doors have been fitted to Government Aerodrome Hangars all over the country, covering in all over *Ten Miles* of openings, varying in height up to 32 feet and in length up to 100 feet. Even larger sizes can be erected if required.

No matter what size, these doors can be easily opened or closed by one man in a minute or two, even in wind or storm, by means of the special Esavian Winding Gear. Specially strong Purpose Made Fittings attached to Sliding Uprights (patented) carry the weight and run on a strong rail set in concrete.

PAMPHLETS AND DETAIL PRINTS GLADLY SUPPLIED ON APPLICATION.

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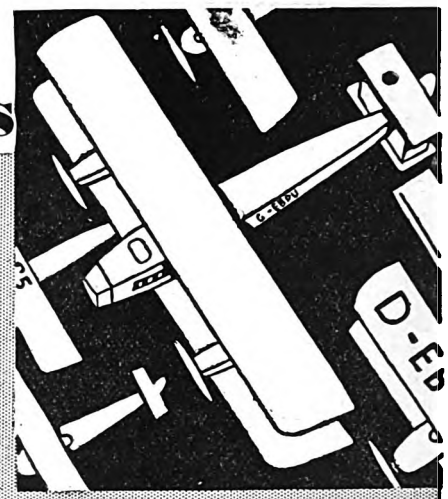

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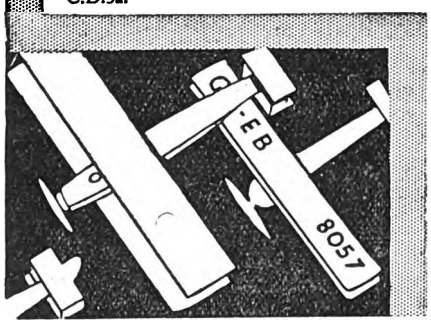

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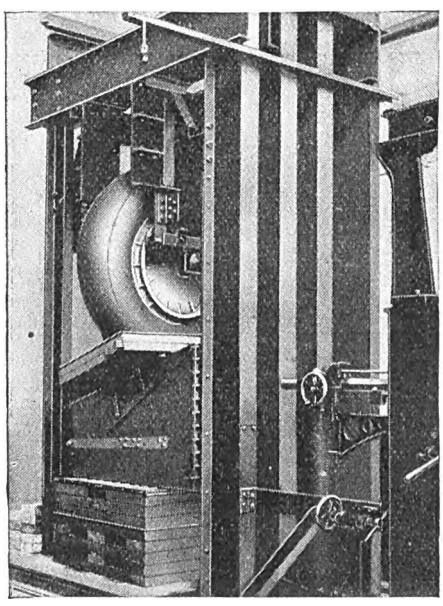

100,000 LBS Testing Machine used to determine the static strength of aircraft wheels.

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COMMERCIAL AERONAUTICS.

THE JAVA—SINGAPORE ROUTE.

On Feb. 10 the Koninklijke Nederlandsch-Indische Luchtvaart Maatschappij (K.N.I.L.M. or Royal Netherlands East Indies Air Lines Co.) inaugurated the Java—Malaya air service when a Fokker F.VII-3m. monoplane (three Armstrong Siddeley Lynx engines) flew from Batavia to Singapore in 7 hours, which time included a twenty-five minute stop at Palembang. The normal time by the fastest steamer is 38 hours.

Among the passengers carried were Sir Josiah Crosby, British Consul-General at Batavia, who was returning to England on leave, Mr. Eveldmeyer, Chief of the Netherlands East Indies Government Aviation Bureau, Mr. Nieuwenheis, a director of the K.N.I.L.M., Mr. Behage, Chief of the K.N.I.L.M. Technical Department, Mr. De Jongh, Director of Public Works in Java, etc. The pilot was Mr. Moll, and a mechanic and wireless operator were carried.

The service will operate once weekly and the single fare from Batavia to Singapore will be $135.

Originally this route was planned to be operated by the K.N.I.L.M. in conjunction with the Air Survey Co. but the latter company was unsuccessful in its request for a subsidy from the Malay States Government. In the meantime the K.N.I.L.M. obtained a subsidy from the Netherlands East Indies Government and began operations on the Batavia—Bandoeng and the Batavia—Samarang—Sourabaya lines, thus connecting up the three main ports of Java.

With the success of these routes the K.N.I.L.M. felt satisfied that it could extend its service to Singapore and permission was asked of the Straits Government to use the R.A.F. base at Seletar, Singapore. This permission was granted and every assistance has been given.

Emergency landing grounds were laid down at Telok Betong, Palembang, Marta Poera, Muntok and Singkep. The delay in the preparation of the last-mentioned ground—on the island of Singkep—has held up the opening of the service, as the Netherlands East Indies Government refused permission for the service to begin until all emergency landing grounds were ready for use.

MALAYAN AIR SERVICES.

On Nov 18 a company known as Malayan Air Services, Ltd., was formed in Kuala Lumpur. This company, whose managing agents are William Jacks and Co. (Malaya) Ltd., has bought a seaplane which is based at Port Swettenham. This will be used on aerial survey and photographic work.

Mr. W. H. Phillips, who has done a considerable amount of flying in Malaya, has joined the company as pilot.

The company is supported by representative members of the planting, mining, business and other communities in Malaya. It has already done a good deal of preliminary in examining the potentialities of prospecting, surveying, passenger and mail and services throughout Malaya.

THE COMPLETION OF THE KARACHI AIRSHIP SHED.

The Times correspondent at Karachi reports that the airship shed there was officially completed on Mar. 9 when the final bolt was inserted in the structure. The Chairman of the Armstrong Construction Company then formally handed the shed over to the local representative of the Air Ministry.

A.A. MAPS AND MAGNETIC TRACKS.

The Aviation Department of the Automobile Association has still further increased its many services for private owners, and Flying Club pilots.

The latest addition is the provision of boards showing the magnetic track to the principal civil aerodromes from the aerodrome where the board is situated. The board displays the A.A. badge, around which is a compass dial marked off in degrees, and lines from the magnetic bearing radiate to the edge of the board, where the names of the aerodromes are marked. This board is already in use at many of the Flying Clubs.

The Association's map service has been developed, and a new series of maps is being prepared. One of these is a general flying map of France, which enables one to fly across France to Marseilles with only two sheets. These maps have the usual valuable data as to aerodromes, etc., on the cover.—M. S.

DISC WHEELS FOR AIRCRAFT.

A further advancement in the design and construction of aircraft landing wheels has been made by the Dunlop Rubber Co. Ltd., who have now introduced alloy disc wheels. The wheel incorporates the Dunlop wheel-base rim, and any form of brake equipment can be used within its contour. The wheel has an excellent streamline contour, and is claimed to be stronger than any other type, as well as lighter, and no separate fairings are required.—M. S.

THE LONDON TERMINAL AERODROME.

ANALYSIS OF FIGURES FOR PAST WEEK.

Trips per Day.—Sunday, 8; Monday, 16; Tuesday, 19; Wednesday, 15; Thursday, 17; Friday, 13; Saturday, 21.

IMPERIAL AIRWAYS LTD.:
London—Egypt—India: London—Le Touquet—Paris—Basle—Zurich: London—Ostend—Brussels—Cologne and return: Machines 42, passengers 240, freight 15¾ tons. India Route: Inward, passengers 0, mail 627 lbs.; outward, passengers 0, mail 732 lbs.

AIR UNION:
Paris—London: Machines 32, passengers 90, freight 8¾ tons.

K.L.M.:
Amsterdam—Rotterdam—London: Machines 10, passengers 49, freight 5 tons.

SABENA:
Brussels—London: Machines 13, passengers 24, freight 3 tons.

DEUTSCHE LUFT HANSA A.G.:
Amsterdam—London: Machines 10, passengers 13, freight 2 tons.

MISCELLANEOUS:
British machines 1, passengers 1.
Foreign machines 1, passengers 1.
Total number of trips by British machines, 43, carrying 241 passengers. Foreign machines 66, carrying 177 passengers.

COMPARATIVE FIGURES.

Week ending Mar. 8:
Machines, 109; Passengers, 418; Crews, 288; Total personnel, 706
Corresponding week, 1929:
Machines, 107; Passengers, 428; Crews, 204; Total personnel, 632
Corresponding week, 1928:
Machines, 103; Passengers, 455; Crews, 202; Total personnel, 657.
Corresponding week, 1927:
Machines, 70; Passengers, 291; Crews, 116; Total personnel, 407.
Corresponding week, 1926:
Machines, 78; Passengers, 197; Crews, 90; Total personnel, 287.
Corresponding week, 1925:
Machines, 35; Passengers, 120; Crews, 67; Total personnel, 187.
Corresponding week, 1924:
Machines, 114; Passengers, 259; Crews, 194; Total personnel, 453.
Corresponding week, 1923:
Machines, 67; Passengers, 207; Crews, 126; Total personnel, 333.
Corresponding week, 1922:
Machines, 53; Passengers, 113; Crews, 88; Total personnel, 201.
Corresponding week, 1921:
Machines, 35; Passengers, 92; Crews, 43; Total personnel, 135.

CROYDON NOTES.

Why, when the weather has been bad, does the B.B.C. always give Aviation news as poor a show as possible in contrast to shipping news? On Wednesday evening last the announcer, a throaty tenor, had a long story to tell about Channel shipping sort of teedling round in circles in the fog, and then added his one bit of Aviation news, which was that a machine from or to Cologne was forced to descend at Lympne owing to the weather.

Now it is perfectly true that one machine got down temporarily at Lympne that day, and that several services were interrupted, but what the B.B.C. did *not* tell the World was that a very large majority of the day's Air services operated as usual that day. Imperial Airways and Air Union Paris services, in both directions, operated to normal schedule for example, and no less than fifteen air services completed trips to or from Croydon.

If the B.B.C. wants to make announcements about Commercial Aviation, which we are all pleased for them to do, they might at least tell the whole story and not pick out one unfavourable incident, thus giving the listening public a wrong impression. On this occasion, for example, anyone knowing nothing about Commercial flying and hearing that Channel shipping was in a spin, would naturally have concluded that the only aeroplane that could move at all that day was forced down at Lympne.

The ancient question of corkage has recently become acute in these parts. A customer said to have been in possession of a cork leg and an unopened bottle of lung tonic, was charged corkage on both in the Aerodrome Hotel according to one report,—but this was afterwards authoritatively denied.

Custom, dating back to the early Neolithic Age, dictates that any person stealthily introducing into any public-house, tavern, or place where they drink, an unopened bottle bought elsewhere, shall and must, if discovered, pay corkage thereon. If he furtively introduces a barrel of beer, bungage, a much more serious mulct is at once imposed. The difficulty seems to be that to introduce secretly alien alcohol to anybody's hostel is by way of being an unfriendly act, and the pouncing on same for corkage by the landlord is regarded by the corkee as an act of war, and there we are, aren't we?

The Air Ministry, not content with having erected a fumed oak monolith [*Query*:—Monolog?—seeing that it is of wood and not of stone.—C. G. G.] of doubtful significance with unintelligible clocks on it in the centre of the Main

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Hall at the Aerodrome, now propose to place an enormous loud speaker on a pinnacle of the tabernacle, which will make our working day about as peaceful as if they tethered the veritable bellowing bull of Bashan to the aforesaid fumed oak monolith. Most of the firms do not seem to have been consulted about this dismal oracle, and nobody can see what earthly use it will be to anyone.

If it is intended for the Public, it may occur to the Air Ministry Department responsible for this frightfulness that the Public, by Air Ministry regulations, are only allowed into the Main Hall under escort, either of the official guide, or of members of the operating Firms. These people can explain what is necessary to their charges with decently modulated voices, and nobody wants to be interrupted by loud bellowings from a brazen throat when quietly explaining something to a visitor.

In the Public enclosure, where a similar loud speaker is to be erected, one hears, the thing will really be useful, and if the one in the Main Hall were to have been placed on the flat roof of the Terminal block, it might have been useful, too, if only to scare sparrows away from picking the mortar out of the Control Tower. In the Central Hall a loud speaker volubly discussing fatuities in a loud voice all day will be a constant source of irritation.

One thing is certain, it will give people every reasonable hope of getting substantial reductions of rent for those offices, if the Air Ministry, as landlords, insist on committing this nuisance.

In this sort of thing, one cannot help seeing a tendency for what was once a human enough Department, as Government Departments go, to crystallise into an abhorrent Civil Service Circumlocution Office, which is convinced it knows what we want a deal better than we do ourselves.

Anyhow, whoever got this loud speaker idea is liable to start a Revolution at Croydon when it starts braying all day in the height of the Summer season in front of all the Company Offices.—SPRY.

CROYDON'S LOSS.

The Rev. P. D. Robins, A.F.C., curate of St. John the Baptist, Croydon, and Chaplain to the Guild of Air Pilots and Navigators, has accepted the living of St. George's, Leeds.

Mr. Robins, who won his decoration during the War 1914-18, was at Croydon in the early days of air transport. He was a pilot with Aircraft Transport and Travel Ltd., and when that firm ceased its activities in 1920 Mr. Robins did a lot of test-flying for A.D.C. Ltd.

In April 1921 he joined the Instone Air Line, with whom he remained until 1924, when he left to take Holy Orders.

THE HOMING BYRD.

On Mar. 10, after an absence of a year and three months, the Byrd Antarctic Expedition returned to Dunedin, New Zealand, the base from which it started. The expedition was enthusiastically welcomed and after the official reception Admiral Byrd made a speech in which he said the expedition had accomplished all it set out to do. He said that the success of the expedition had been in a way due to luck and was largely owing to the very unselfish work and attitude of his men.

MOTH SERVICE IN INDIA.

A branch of the De Havilland Aircraft Co. Ltd. has been formed in Karachi under the management of Wing Cdr. D. S. K. Crosbie (late R.A.F.)

A fully comprehensive stock of spares and parts will be kept in stock at Karachi. These will include sets of wings, rudders, tail-planes and all parts of both the Moth and Gipsy engine.

Smaller depots will be maintained at Bombay and Calcutta, with a supply of the ordinary working spares, such as tail-skid springs, wheels, airscrews and small engine spares, which may be regarded as consumable stores.

A STOUT EFFORT.

On Mar. 8 two brothers, Messrs. H. G. B. Linnell and A. J. Linnell left France in their D.H. Moth to fly to Worthing where they were to play in a Rugger match. They landed at Lympne after crossing the Channel and then flew along the coast towards their destination.

On the way they ran into fog and got lost over the water. When they suddenly found themselves close to cliffs, they landed on the beach as soon as they could see one. This turned out to be the shingle just opposite the offices of the Brighton Electric Railway, and the machine turned over,—fortunately without hurting either of the brothers.

Mr. Herman Volk, who owns the railway, promptly had the machine put right side up and had it towed to a garage. The two brothers hired a car to take them to Worthing which they reached in time for their game.

By a curious coincidence, the spot where they landed is almost exactly that on which Mr. Volk built the first seaplane station in England,—a big tent-hangar in which he housed the first flying-boat which was brought to this country by Mr. Glenn Curtiss and Lt. John Porte, R.N.,—from which was developed the famous Felixstowe boats.

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Beg to announce that they are now in a position to accept orders for GLIDERS and SAILPLANES of types approved by the B.G.A. Orders will be accepted in strict rotation.

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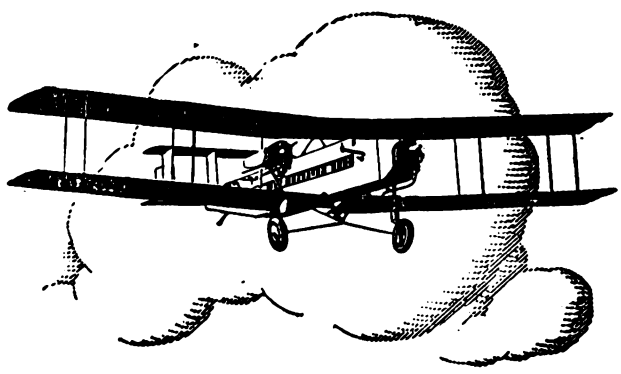

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Telegrams: "Impairlim, London."

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Cables: Lockers 5 Letter Code. Telegrams: "Booth, Birmingham."
Bentley's Code, A.B.C. 5th and 6th Editions.

The British Russell Parachute Co., Ltd
Aircraft Accessories,
Dominion Works, Dunsmure Road, N.16.
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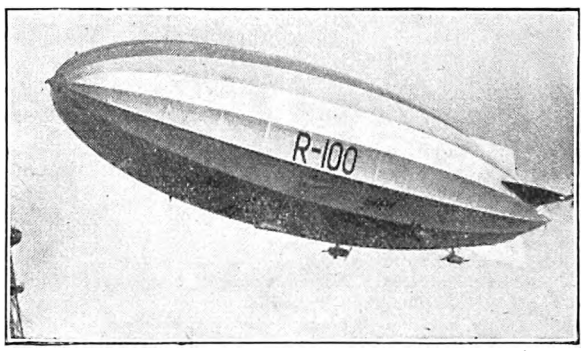
WORLD'S LARGEST AIRSHIP



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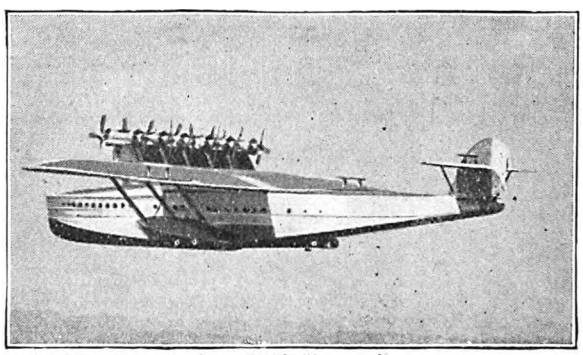

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D. NAPIER AND SONS LTD.

The Directors of D. Napier and Sons Ltd., the makers of the famous series of Napier Aero-engines, announce that the net profits for the year ending Sept. 30, 1929, amounted to £192,329 6s.

They have decided to recommend at the forthcoming Annual General Meeting that a final dividend of 2s. per share shall be paid on the ordinary shares of the Company in respect of the year ending Sept. 30, 1929, and that part of the undivided profits shall be capitalised and applied in paying up in full ordinary shares to be issued to the ordinary shareholders registered on the books of the Company as at Mar. 23, 1930, in the proportion of three new ordinary shares for each ordinary share then held.

NEW COMPANIES.

Lioud Carburetter Company Ltd.—Private company. Registered Mar. 8. Capital, £100 in £1 shares. Objects: To acquire patents relating to internal combustion engines, and to apparatus or appliances used in connection therewith, and to carry on the business of manufacturers and repairers of and dealers in internal-combustion engines of all kinds, etc. The directors are: M. G. Baillie (chairman), 16, Kensington Square, W.8. Earl of Halsbury, Deerleap, Westcott, Surrey. Solicitors: Clarke, Square and Mills, 28, Bolton Street, W.1.

George Pretyman Ltd.—Private company. Registered Mar. 5. Capital, £1,000 in £1 shares. Objects: To carry on the business of aircraft consultants, general agents, shipping and tourist agents, agents for the charter, hire or sale of aircraft, motor-cars and all kinds of marine craft; also to carry on business as a travel bureau, and to establish, work and carry on lines of aerial communication by means of aeroplanes, seaplanes, flying-boats, airships and other aerial conveyances, etc. The subscribers (each with one share) are: A. J. Fincham, 64, Harold Road, Upton Park, E.13, solicitor's clerk. H. E. Webb, 115, Hurlingham Road, Fulham, S.W.6, solicitor's clerk. The first directors are to be appointed by the subscribers. Solicitors: Hewlett and Co., 2, Raymond Buildings, Gray's Inn, W.C.2. Registered office: 8, Old Burlington Street, W.1.

MORTGAGES AND CHARGES.

Cirrus Aero-Engines Ltd.—Debenture dated Feb. 21, 1930, to secure £10,000, charged on land at Kingsway, W.C., and the company's undertaking and property, present and future, including uncalled capital. Holders: Branch Nominees Ltd. Also second mortgage debenture of same date to secure £7,250, charged on the company's undertaking and property, present and future, including uncalled capital. Holders: English Instrument and Gauge Company Ltd., Regent House, Kingsway, W.C.2.

PERSONAL NOTICES.

Births.

ATKINSON.—On Mar. 3, at Islip, Oxon., to Margaret (*née* Neale), wife of H. A. C. Atkinson, late R.A.F.—a daughter, Janet.

BRAMSON.—On Mar. 6, at The Lodge, Pinner, to Eileen, wife of M. L. Bramson—a son.

COOKE.—On Mar. 6, to Phyllis, wife of Sq. Ldr. C. B. Cooke, R.A.F., Biggin Hill, Kent—a daughter.

SHEPHERD.—On Mar. 1, at The Lodge, Walberswick, Josephine, wife of Wing Cdr. Philip Shepherd (retd.).—a son.

GLIDING.

THE LONDON GLIDING CLUB.

On Sunday, Mar. 16, the London Gliding Club are to make some preliminary tests with their two primary type gliders, before these machines are taken to Ivinghoe for the use of members. Members and prospective members who wish to attend or to assist in the launching should apply to the Secretary, 44a, Dover Street, W.1.

PREMATURE PUBLICITY.

The following letter has been received:—

Sir,—I feel that your criticism of the Kent Gliding Club's action in experimenting with a glider before an audience charged for admission to the aerodrome on Sunday, Mar. 2, demands a reply, and I should be glad if you would publish the explanation.

In the first place, the initial trials were carried out a week previously and although we attempted to keep it quiet a large crowd gathered, some people driving cars right across the aerodrome, thus thoroughly annoying the farmer to whom the land is now let.

We were informed that we would not be allowed to use the land again without payment for it and that we undertook to keep cars "off the grass."

It was therefore resolved to charge for admission and for the parking of cars but *no advertisement or invitation* was issued to the public to induce them to visit the aerodrome to see us glide.

Those who actually did pay for admission were either Maidstone and district residents who were fully aware of our intentions to continue preliminary experiments, or people using the main road running along one side of the aerodrome.

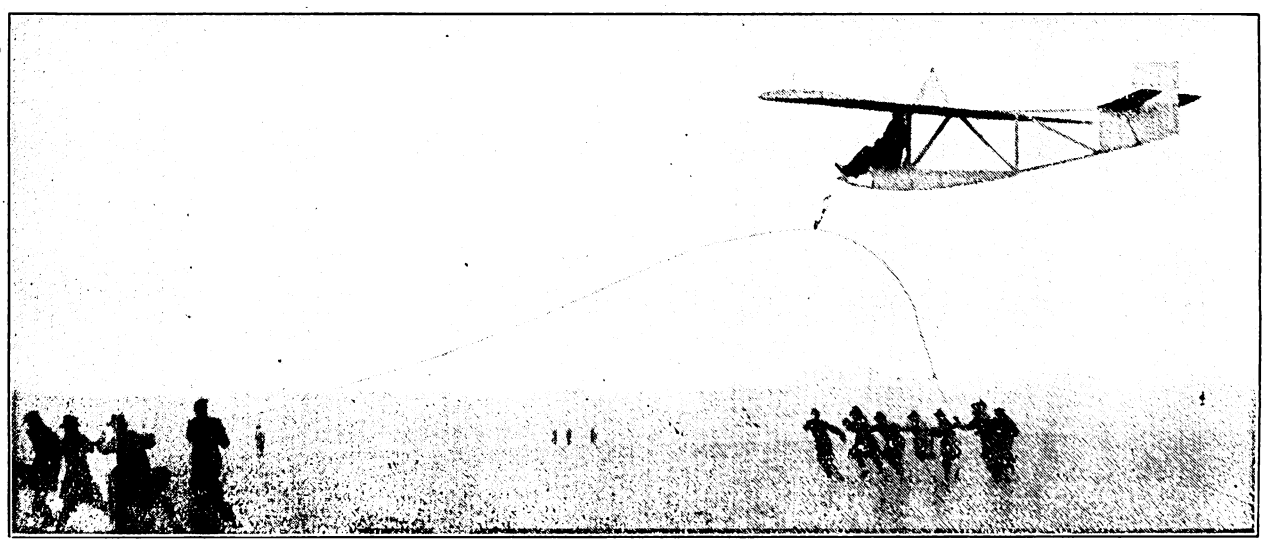
Left to our own choice, we would have preferred to carry out our experiments privately, and as the public were not induced by advertisement to visit the aerodrome we cannot see justification in your suggestion that we have done harm to the movement. If nothing else, by giving only a definitely safe performance, considering the stages of our experiments, we prevented any idea of danger being a prevailing one.

(Signed) C. H. Lowe Wylde.

Mr. Lowe Wylde's letter does not agree with the fact that before this unfortunate performance the glider was exhibited in a motor shop and that the forthcoming exhibition of gliding was largely advertised locally. If the enterprising partners, whose energy in designing and building the glider in such short time is entirely commendable, had in fact wished to keep it quiet they would certainly not have advertised it in that particular way nor would they have had newspaper people and cinematograph operators on the field.

One happens to have seen the cinematograph pictures of this performance, and consequently one says definitely that they can only bring contempt on the sport of gliding. Those who know nothing about gliding will think that being bumped off the ground for a few seconds at the end of a piece of elastic is an extraordinarily silly game, and those who have read of the tremendous soaring feats of the German pilots are bound to contrast the little bounces of the British glider unfavourably with the performances of our friends in Germany.

One can only hope that before very long the Kent Gliding Club may find a first-class gliding ground and may be able to give an exhibition which will remove the unfortunate impression caused by their premature publicity.—C. G. G.



ABSOLUTE CEILING.—Mr. Lowe Wylde in the Kent Gliding Club's machine just after a catapult start.

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MISCELLANEOUS ADVERTISEMENTS.

All advertisements for this column should arrive at this office by first post Monday, to ensure insertion.

For the convenience of Advertisers, replies can be received at the office of THE AEROPLANE, Cannon House, Pilgrim Street, London, E.C.4.

Special PREPAID Rate—18 words 4/6. 3d. per word after; 13 insertions, 18 words, 4/-; 26 insertions, 18 words, 3/6; 52 insertions, 18 words, 3/-. 2d. per word after. Situations Wanted ONLY—18 words 1/-. Box No. 6d. extra.

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AIRCRAFT INSTRUMENTS.

Aeroplane Wheels, New, fitted with Dominion 26 x 2½ heavy tread tyres, and new tubes. Pair with axle, 70s. carriage forward; K.L.G. Plugs F.7, 2s. 3d.; Altimeters, 10s. 6d.; Shock Absorber, 5-8 in., 6d. per yard; Aero bolts, nuts, washers, etc., 7lb. bag, 4s. Above postage paid. Send for illustrated list. Coley Ltd., Ordnance Works, Queen Elizabeth Road, Kingston-on-Thames.

AIRCRAFT WANTED.

Aircraft, with or without C. of A., crashed machines, parts, engines. Immediate cash. Particulars—Arnold Jones, 58, Warren Street, W.1.

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Air Survey Co. Ltd., 3, Grosvenor Gardens, S.W.1. (Victoria 5903.) Dum Dum, Calcutta, and Monkey Point, Rangoon.

The Aircraft Operating Co. Ltd., 8, New Square, Lincoln's Inn, London (Holborn 8131), and Bulawayo, Southern Rhodesia; Cairo, Egypt; Rio de Janeiro, South America: Contractors to the Ordnance Survey. Laboratories and Subsidiary Company for aerial photography in the British Isles. Aerofilms Ltd., Colindale Avenue, Hendon (Colindale 6183 and 6184).

PATENTS.

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Aerofilms Limited, Aerial Tours, Taxi Work, Aerial Photography. Air Survey. Colindale Avenue, Hendon, N.W.9. Phone: Colindale 6183 and 6184.

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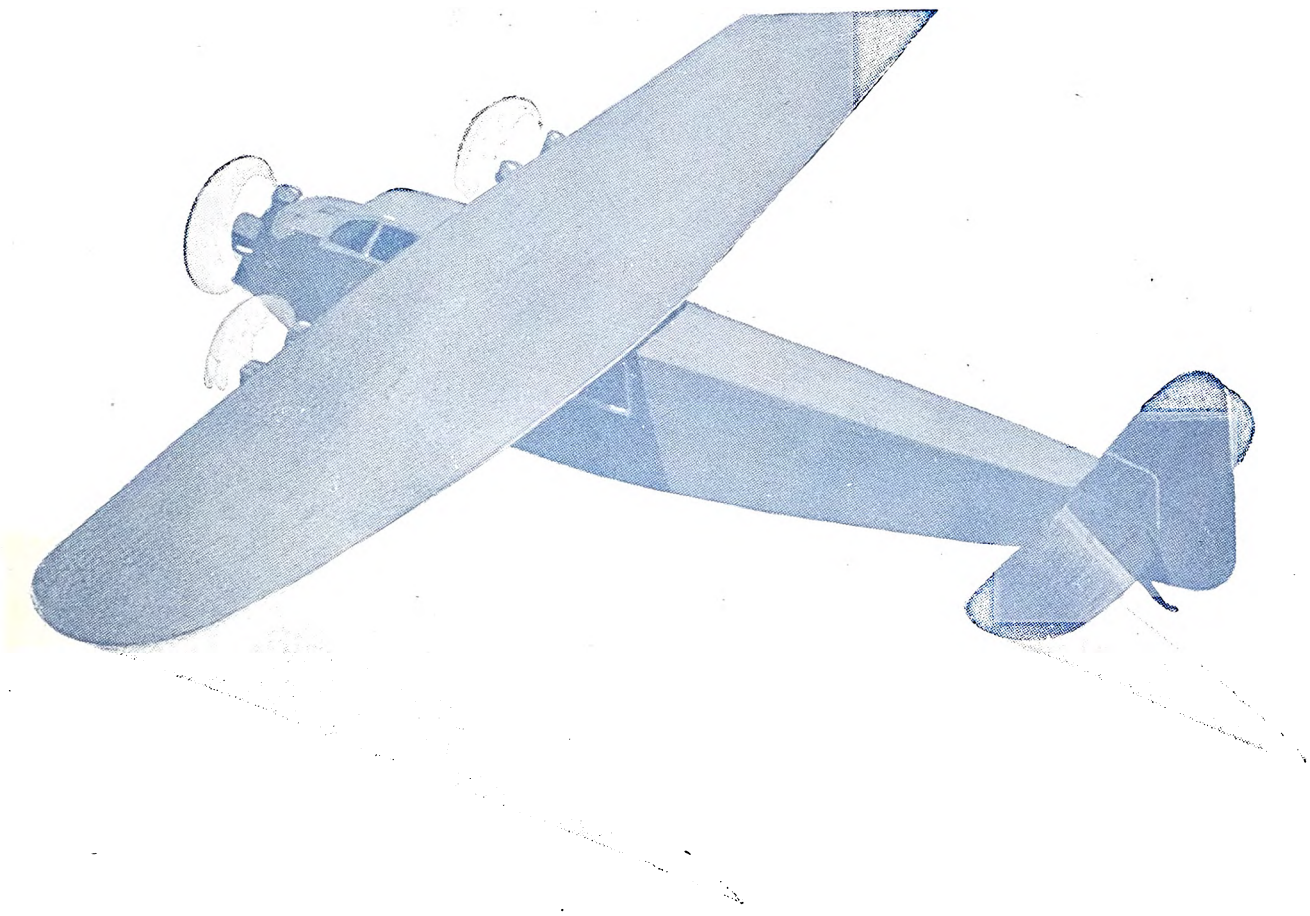

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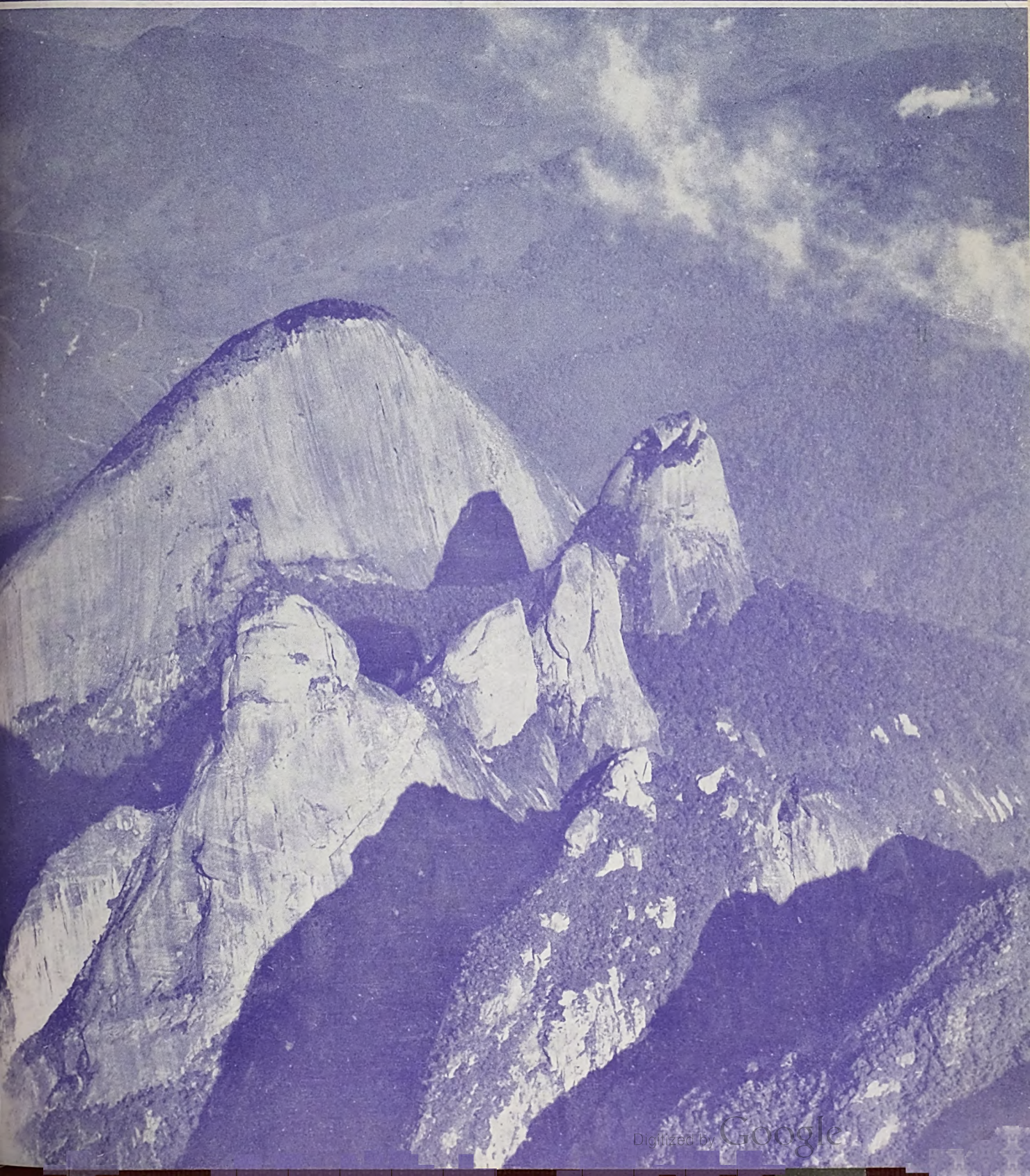

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ON HOW TO GET INTO AVIATION.—II.

Women in Aviation.

The first instalment of this article "On How to Get into Aviation" has produced a considerable amount of correspondence, although it was originally intended to save readers of this paper the trouble of writing and asking questions. Nevertheless, as most of this correspondence has to do with points which were not covered by the first article one has endeavoured to deal with them in this second instalment.

One of the first letters came from an enterprising young woman who is anxious to get a job in aviation herself. She writes that she was lucky enough to get an excellent job with a firm connected with the Aircraft Industry at the Aero Show last July and now wants a permanent job, but that there does not seem to be any post in aviation open to women holding Certificates as Class A pilots who have not the means to own a machine and so bring themselves before the public eye.

This question of what women can do in aviation is always interesting. Personally one is rather inclined to the view that the best help women can give to aviation is as wives and mothers, so as to make the men-folk in aviation happier and more efficient. The lamentable fact is that apart from these two occupations there is nothing in the World that a man cannot do better than a woman can do it. Even in such occupations as cooking and dress-designing men are at the top of the profession, on sheer merit.

On the other hand there are many jobs in aviation which women can do quite well. And there are always exceptional women who happen to be able to do a man's work in certain jobs better than any man who has had a try at those particular jobs. The worst trouble with women is that they nearly always have a tendency to claim a man's rights and to retain a woman's privileges at the same time. They claim a man's right to shoulder a man out of the way in the crowd of competition, and then they expect the man who has been shouldered to stand aside like a perfect little gentleman and let them through.

Be that as it may, the woman who wants to get into aviation ought to realise that she must start at the bottom of the tree on level terms with young men of her own age and station.

A large number of women are already employed in aviation, in all grades of work. In the workshops women are employed on light machine-work and in these days of metallised production they are employed on assembly work and light fitting also. In the fabric shops, where the covering for wings, fuselages and control surfaces are made, and in the dope shops, the work is almost entirely done by women. Girls starting on these jobs are hardly likely to rise to high positions in the works, so one does not recommend them as a career for a young woman.

The offices of aeroplane firms do offer an opportunity for a career. Women are employed as tracers in the drawing offices and in that way a really intelligent girl can absorb enough practical engineering to make herself quite useful on the technical side. Some of the most valuable research work at the National Physical Laboratory is done by women, and that may be taken as an indication of the direction in which such employment may lead.

On the commercial side women who start as typists and shorthand writers may progress to becoming secretaries to directors, with just about as much power as the directors themselves and often a great deal more influence. Or they may progress into the advertising department and become that terrible thing called a publicity expert.

On the flying side there is less opportunity for women. No Government in its sane senses is ever likely to allow women to act as regular air-line or charter pilots, any more than the London County Council would be likely to license women as 'bus drivers or taxi-drivers. There are definite physical reasons why women are unfit for such work, and this is not the place to discuss physiology and biology.

The best opportunities for women on this side of aviation are probably as secretaries of clubs or flying schools or privately-owned aerodromes. In such positions women have already proved conspicuously successful. They should also be competent managers of the catering side of such institutions,

"IN TRYING TO ACHIEVE SUCCESS
NO ENVY RACKS OUR HEART;
AND ALL THE KNOWLEDGE WE POSSESS
WE MUTUALLY IMPART."—*(Sir W. S. Gilbert.)*

IN GREECE.—Air Vice-Marshal Sir Sefton Brancker getting ready to leave Tatoi aerodrome for Salonica in one of the Hawker Horsley torpedo-bombers (Rolls-Royce Condor engine) recently supplied to the Greek Government, with whom British Aviation is co-operating. We supply the Greek Air Force, and Imperial Airways are organising their service from Greek airports.

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or they might look after the social side, if they have enough ability and discrimination and determination to be thoroughly rude when necessary.

If a young woman is really keen on getting into aviation there is no harm in her being a pilot if she can afford the luxury of learning, but if her means are limited she will do very much better to start by becoming a thoroughly efficient shorthand-writer and typist.

MATHEMATICIANS.

In answer to those critics who have called one over the coals for certain remarks about mathematicians, one would quote the History of the Staff College.*

In its early days the training at the Staff College was almost entirely mathematical, and Staff Officers from Camberley and earlier still from High Wycombe were, with certain brilliant exceptions who had defeated their Professors, very properly regarded with scorn by real soldiers. In the War 1914-18 our Staff trained at Camberley on practical lines, were recognised as the finest Staff Officers in the World. Over and over again the French, whose Staff was by no means bad, had to borrow officers from us to put their staff-work right—notably in organising the historic "endless chain" of supplies for Verdun and in organising the Air Defences of Paris.

For this change we have to think His Royal Highness Prince Albert of Saxe-Coburg-Gotha, Prince Consort of Queen Victoria, and grandfather of our present King. Only within the last few years have people in this country begun to realise that Prince Albert was one of the greatest men of his day, and that the rise of the British Empire, and of the British Army, in Queen Victoria's reign was due to him in a greater degree than to any other one man.

Writing to His Royal Highness the Duke of Cambridge on October 31, 1857, concerning a draft syllabus of the proposed course at the Staff College, Prince Albert said:—"If we were to make our Staff Officers theoretical mathematicians, we should inflict the greatest injury on the Queen's Service, *for it is a well-ascertained fact, and admitted all over the world, that mathematicians, from their peculiar bent of mind, do of all men show the least judgment for the practical purposes of life, and are the most helpless and awkward in common life,* whilst the Staff Officer should have the greatest amount of knowledge of men and the world, and the greatest readiness in judging passing events and circumstances."

**The Staff and the Staff College*—by Brevet-Major A. R. Godwin-Austin, O.B.E., M.C., with an Introduction by Sir George F. Milne, G.C.B., G.C.M.G., D.S.O., A.D.C., LL.D., Chief of the Imperial General Staff—A book which should be read by every Air Force Officer, and by all who are concerned with the Art and Science of War. It is one of the most illuminating and one of the most amusing books ever written.—(To be had from THE AEROPLANE Book Dept., Cannon House, Pilgrim Square, E.C.4. Price 22s. post free.)

The Duke, in passing these comments on to Lord Panmure, said there was "a great deal of truth in them," and that consequently he had asked the Council to submit a revised draft.—No comment seems necessary.

THE WELL-TO-DO YOUTH.

Now let us consider the case of the boy who has fairly well-to-do parents and has been to a good school. He need not necessarily have been to one of the major public schools or even to a minor public school. Quite a number of the finest officers in all the King's Services have been "educated privately," as it is sometimes called. In other words, they have been to a private school, or their parents may have educated them at home because they could not afford to send them to a first-class public school.

Here again we have the same clear divisions. There is the boy who distinctly ought to go to Cranwell and become an officer in the Royal Air Force. There is also the boy who would sell his soul to be able to go to Cranwell, but cannot go because the doctors will not pass him.

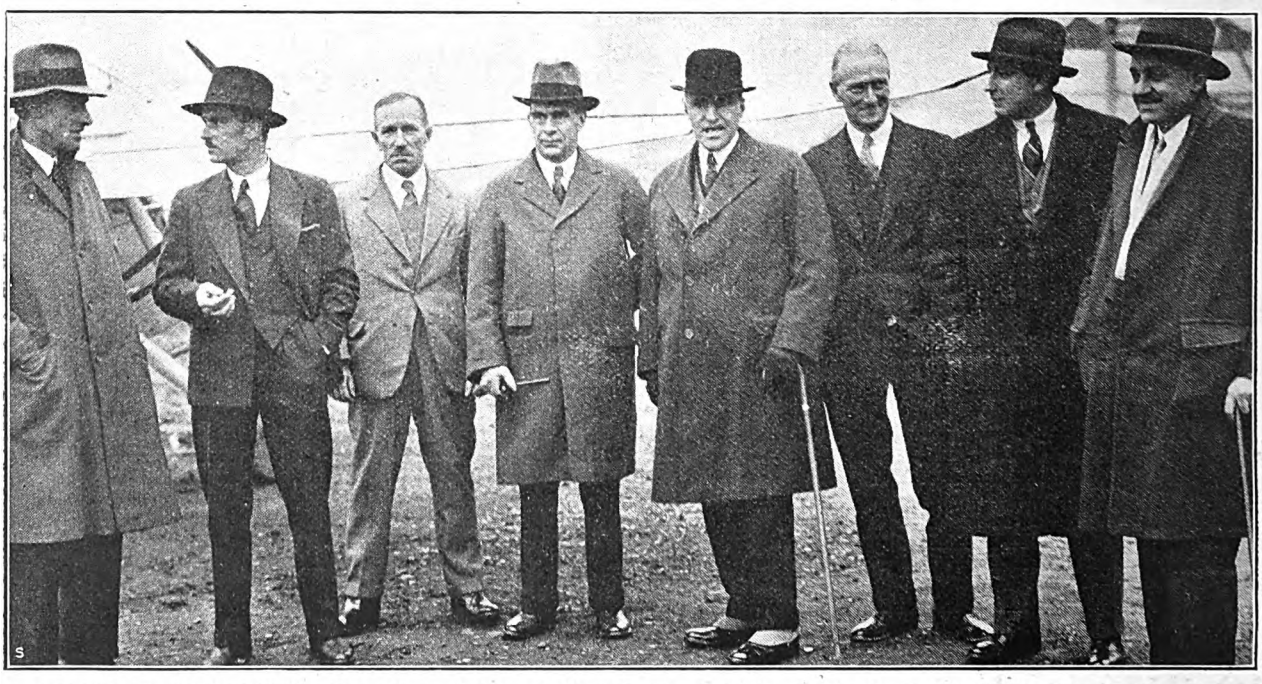
Also, there is the boy who objects to military discipline,—using the word "military" in the sense of pertaining to a fighting service. And there is the boy who is such a keen engineer that he wants to devote the whole of his time and energy to aeronautical engineering, and is not in the least interested in the fighting side of an aviator's work.

Also, there is the boy,—and he is the least useful of the whole lot,—who is bent on becoming a pilot and does not care very much about anything else.

We may, in fact, deal with this latter type first, because although he is the least useful of all, he intends clearly to be a pilot and it cannot be helped. The officer in the Air Force who is devoted to flying and nothing else may be distinctly a nuisance. Naturally, every officer ought to be keen on flying,—but the youngster who is so keen on flying that he will not take any interest in the organisation and administration of his squadron is just about the most useless type of officer.

The trouble is that the Air Force cannot guard against them. Such a boy may pass his examinations at Cranwell well enough. He may go straight through the Cadet College without giving actual cause of offence. He may, in fact, be the most brilliant pilot of his term by natural aptitude. And though he may appear already to the authorities at Cranwell as unlikely to make a valuable officer, yet there may be no excuse for turning him out of the Service, or refusing to give him a commission when he has passed out of Cranwell.

Such a youngster does, in fact, serve a good purpose in that his very keenness on flying raises the standard of flying for the other cadets or other young officers after he has been posted to a squadron. He is not likely ever to rise to high rank, but even then one never knows, because in the course of a long and somewhat mis-spent life, one has met many men who after showing very little promise up till practically middle age, have suddenly turned round some



IMPERIAL INTERESTS.—Canadian visitors at Stag Lane. Left to right: Capt. G. de Havilland, Mr. Alan Butler, and Mr. C. C. Walker, Directors of The De Havilland Aircraft Co. Ltd.; Mr. Black, of Nova Scotia; Col. the Rt. Hon. J. L. Ralston, K.C., C.M.G., D.S.O., M.P., Canadian Minister of Defence; Mr. F. T. Hearl, Works Manager of the De Havilland Co.; Sq. Ldr. A. D. Shearer, Canadian Liaison Officer; and Major Brown, Secretary to Col. Ralston.—(*"Aeroplane" photograph.*)

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sort of mental corner, and have become extremely useful in some line in which nobody would have suspected them of being interested,—and even in lines in which they were not interested until they just happened to get round that corner.

Therefore, the keen youngster who loves flying for flying's sake, need not be altogether discouraged by his seniors if he does not show very much keenness in technical work or staff work or anything else. There is always hope for him, and, in any case, if he flies well enough, he is bound to be useful, particularly as a test pilot.

When once a boy has got into Cranwell, his parents need trouble very little about him. He will find his own level in the Air Force. If he has any particular bent towards engineering or electrical work or anything else, he will have his chance sooner or later of developing along those lines.

The Aeronautical Engineer.

The boy who really does need advice, is the youngster whose parents have a little money and are even prepared to sacrifice their own comforts so long as their boy has a chance to make good. One is all against parents sacrificing themselves unduly for their children. If a boy has anything in him, he will make good on his own account sooner or later, and the lower down on the scale he starts the more he will learn before he reaches the stage when responsibility is put upon him.

If such a boy is physically unfit to go into the Royal Air Force through Cranwell, or if there are other good reasons why he should not join the Royal Air Force, and if he is determined to get into Aviation, then the best thing to do, is to give him as good a general engineering education as possible. At school he should study practical engineering; but at the same time he should be careful not to neglect what are generally called The Classics, and he should study history and literature. If he devotes himself too much to pure Science, he is liable to drift over to the scientific side of engineering, in which there is less money and less likelihood of rising to an important position in business than there is on the practical engineering side and on the commercial side.

When he finds himself approaching middle age in a responsible position where he has to handle and deal with other men, he will find that a knowledge of History and of what are called the Humanities will stand him in good stead, and will be more useful to him than pure mathematics, or high-brow science. He can always hire specialists at quite a reasonable price to do for him what scientific work is necessary to his job. But money cannot buy a knowledge of humanity or experience of human beings.

When such a boy is of an age to leave school, he should be left to choose for himself whether he goes into an aircraft factory as an apprentice, or whether he goes to a University. If he can afford to go to a University, so much the better for him. But he will have to wait all the longer before he is self-supporting.

The boy who goes as an apprentice to an aircraft factory at the age of seventeen or eighteen ought to be able to earn his own living at the age of twenty-two or twenty-three, and he may be in quite a decent position at the age of twenty-six or twenty-seven. If he goes to a University he will be only taking his degree at about the age of, perhaps twenty or perhaps twenty-one, and then he will have to start at the bottom as a wage-earner. Which means that the other boy will have two or three or even four years' start of him on the pay-roll of any firm in which the two happen to be.

University Training.

Where the University training does come in is when a man reaches middle age, and is in a really important position. Then he may find that in an argument or a business deal, or in taking over an important post, his University degree may turn the scale into his favour, or may make more money for him.

Also there is the very important point that if a young man goes to a University he meets people of a sort whom he would not be so likely to meet if he spent those same years in a work-shop. And in later life he may find that friends and acquaintances whom he made at the University are of high value to him when he is engaged in a big business deal, or when he is concerned in the Politics which form part and parcel of any great industry.

Therefore, on a whole, if parents can afford to send their son to a University the youngster should always be sent. On the other hand, so long as a boy has a good home to go to when he is not actually in the work-shop, and so long as he has good home influence behind him, he is not likely to come to much harm by going to a factory as an apprentice while he is young.

The main point on which parents should insist is that if their boy goes into a factory as an apprentice he shall keep ordinary working-men's hours, and shall not have any special privileges as a premium apprentice. An enormous amount of harm has been done, and an enormous amount of money has been wasted, by sending young men at the age of eighteen to twenty years of age to big engineering works and letting them have too much money to spend and letting them have special hours, different from those of the men in the shop, in which they can idle about the local factory town and get into trouble.

When a young man has served his time in an aircraft factory, or has taken a scientific degree at University, he has still to find himself a decently paid job. And all youngsters who want to get into aircraft engineering should bear this in mind.

The young man who is really keen and intelligent and a hard worker may so impress his employers during his apprenticeship that as soon as he is out of his time they may offer him quite a decent job in their own factory. And, if he does not happen to like his immediate superiors in that factory, he may in his spare time make friends in other factories who can introduce him to people therein who can give him a decent job.

First Principles.

The great thing for young men to remember at that time of life is the value of making friends. Quite apart from the fact that life without friends is not worth living, there is the equally important fact that the best jobs in the World are almost always got through the recommendation of a friend.

The late Admiral Lord Fisher is credited with having said that "favouritism is the foundation of efficiency." This is perfectly true, because if a man is efficient himself he cannot be bothered with friends who are not efficient. And so, if a young man starting in the profession of Aeronautical Engineering chooses for himself friends who are clever and efficient, he will find that as he grows older those same friends will be of immense value to him in his profession or business, besides making life happier as friends.

Another important thing for a young man to remember at that period of the beginning of his career is never to worry about stopping work. One of the most irritating things in life is getting to work at the appointed time. That, and catching trains, is probably responsible for more nervous breakdowns than anything else in industry. But the habit of knocking off strictly on time is probably responsible for more ruined careers.

If a man once gets the reputation of being a clock-watcher, always ready to go as soon as the clock strikes or the whistle blows, he will find that his superiors have very little use

A LIGHT CABIN MONOPLANE.—The D.H. Moth III (D.H. inverted Gipsy engine) flying at Stag Lane.
—("*Aeroplane*" *photograph.*)

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THE FAIREY III.F. TYPE AIRCRAFT
(fitted with Napier "Lion X1" engine)

AGAIN SUCCESSFUL

Outstanding merit has undoubtedly been achieved by the successful conclusion of the Annual Cairo-Cape-Cairo flight undertaken by the Royal Air Force.

The four Fairey III.F. Aircraft reached Heliopolis on the 24th February, 1930, after having covered an aggregate mileage of 52,000 miles, carried out exactly to a pre-arranged time schedule and without mishap.

Even more meritorious is the fact that this is the fifth year in succession that this flight has been undertaken with complete success by Royal Air Force Units equipped with Fairey Aircraft.

FOUR AIRCRAFT
AN AGGREGATE OF
52,000
MILES
FLOWN TO SCHEDULE.

FAIREY AIRCRAFT

THE FAIREY AVIATION CO. LTD.
HEAD OFFICE AND WORKS :: :: :: HAYES, MIDDLESEX
AND ALSO AT HAMBLE, NEAR SOUTHAMPTON.

HIGH PERFORMANCE SERVICE AIRCRAFT

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for him, and that he has little chance of promotion. On the other hand, the man who is willing to slog ahead till his job is done, or, at any rate, who has the sense to go on working till his immediate boss has left the office or the workshop, gets the reputation of being a good willing worker and is marked down for advancement.

Personally one owes an important step in one's career largely to the fact that in one's very first job one used to stop till nine or ten at night checking over workshop returns and invoices and delivery sheets and such things with the Assistant Works Manager. One did not do it for any particular love of work or for love of the job, but merely because the Assistant Works Manager was a good chap and had the decency to be kind to a very junior employee of the firm. A few years later when he was Works Manager and a Director of a very important concern he gave one a very good job because he said he liked people who did not want to knock off as soon as the whistle went.

The man who works overtime without expecting to be paid for overtime will always find that he gets that money back with compound interest in later years.

These remarks naturally apply to any other business just as much as they do to the Aircraft Industry. And one did not set out to deliver a homily on the behaviour of apprentices in factories. But possibly some youngsters who are now going into the Aircraft Industry may lay these remarks to heart and find later that they are good advice.

Doing One's Best.

More or less in this connection there is a story which is worth telling. During the War 1914-18, a certain Gunner Major had in his battery a well-meaning sergeant who was always in trouble of some sort. If a horse broke loose, or fell down and hurt itself, or went sick, it was always in his lines. If harness or fodder went amissing it was his. One day he was being told-off by the battery-commander, when, almost in tears, he broke in with "Well, Sir! I'm sure I'm doing my best."

"Damn it! Sergeant," retorted the Major, "I don't want you to do your best! I want you to *do the job*."

That is just where so many people miss success. Either they do their best as *they* think things should be done, and don't do the job as their employer wants it done. Or else they haven't the sense to see that the job is too big for them, or is over their heads, and that they had better either give it up or ask for help.

Doing one's best is the next worst thing to meaning well or being worthy or thoroughly nice. If you have a job to do, either do it properly or quit.

The Research Worker.

The young man who has private means enough to keep him fairly comfortably, but wants to do something useful in the World and wants to earn reasonable pay for it, may, after he has served his time in the shops, or after he has left the University, become a useful member of aeronautical society by specialising on research work rather than on workshop production.

As has already been said, the scientist is never so well paid as the production man or the commercial man. But the scientist who is a practical experimenter and not merely a pure theoretician is to a very great extent the man who does most towards progress in aviation.

At the Air Ministry there are two parallel departments—the Directorate of Scientific Research and the Directorate of Technical Development. Each is complementary to the other. Possibly technical development is responsible for the greater number of improvements in aeroplanes and engines and their equipment. But scientific research every now and then does do something which puts the whole of Aviation forward in one big step. And at all times such research is necessary to act as a check on pure technical developments, if only to explain why technical developments behave as they do.

Therefore, the young man who can afford to devote himself to scientific research may consider himself a very useful member of society, and there is always the off-chance that he may make some great scientific discovery which will enable all aeroplanes to do those things which we know they ought to do and they definitely do not.

For example, such a research worker might hit on some perfectly obvious idea which will do for aeroplanes or aero-engines something as important as was done when the effect of slots was discovered.

In saying this, one is casting no aspersions on Science, when it is real knowledge. But we must remember that our aeronautical scientists were just as sure that they knew everything worth knowing when the Armistice was signed in 1918 as they were that they possessed all aeronautical knowledge when an aeroplane did 200 miles an hour for the first time. And then they were just as sure that they knew all about everything as they were when an aeroplane first did 300 miles an hour.

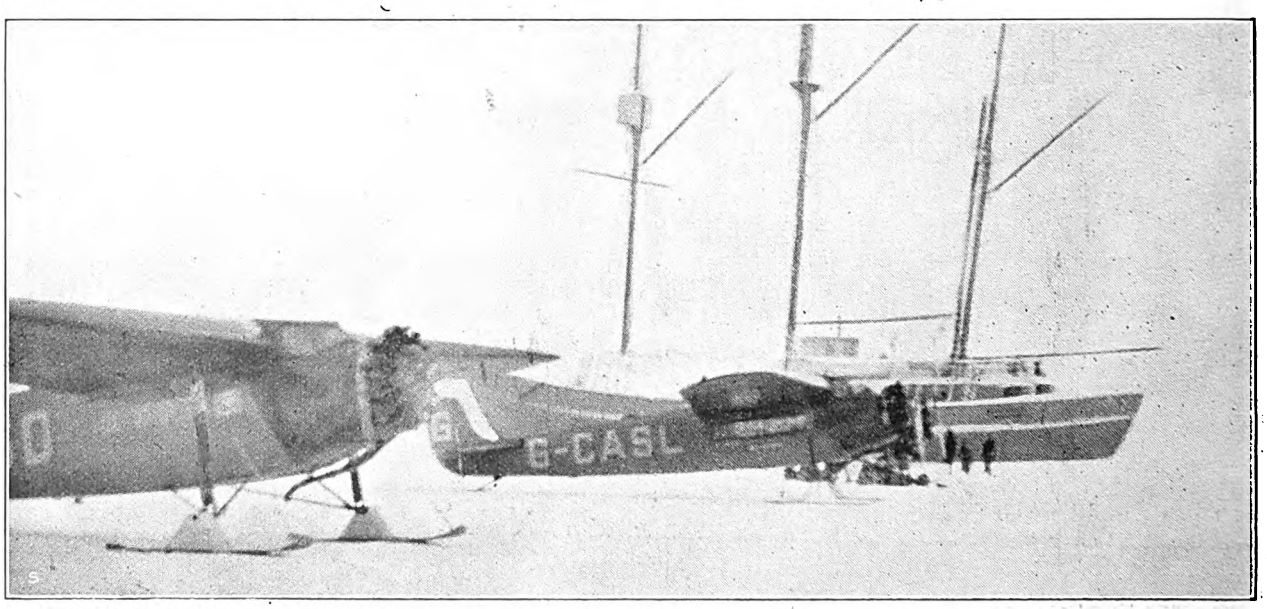
We have so often been told that we know all there is to know on a certain subject just before somebody else has come along and upset all ideas on that subject, that any young man who has a taste for research may very well devote himself to that work. Even if it is not well paid it is always interesting. And there is always the off-chance of finding a scientific gold-mine

The Man Who Wants a Change.

So much for the youngsters who are starting in life. A much more difficult problem is that of the young man who has already started in life and wants to get into Aviation.

If a young man has mechanical tastes and is physically fit and is keen enough and has no money, he can always make an attempt to get into the Royal Air Force. Gradually, as the supply of aircraft apprentices from Halton increases, the non-commissioned ranks of the Royal Air Force will become filled up from Halton. But in the meantime a certain number of young men are accepted every year as aircraftmen. Application to enlist should be made at the nearest Recruiting Office.

If a man already has a trade, that is to say, if he is a skilled worker in metal or wood, and physically fit, probably the Air Force will be glad to have him. In the Air Force he will learn the application of his own trade to aircraft. And when he leaves at the end of his six years or seven years, or at the end of whatever period to which he



IN THE ARCTIC.—Two Western Canada Airways' machines about to leave Cambridge Bay for Bathurst Inlet while engaged in the search for the MacAlpine party. They were the first aircraft to visit this settlement, and the schooner in the background was the first to make the North-west Passage during the year.

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ON AND OFF THE FROZEN ST. MORITZ LAKE WITH TWO UP AND LUGGAGE!!

CIRRUS ENGINE

HAVING FLOWN TO LE BOURGET NON-STOP, ON TO BALE AND FROM THERE TO ST. MORITZ, LT. C. R. V. PUGH, R.N., WITH PASSENGER AND LUGGAGE LANDED ON THE FROZEN LAKE AT ST. MORITZ.

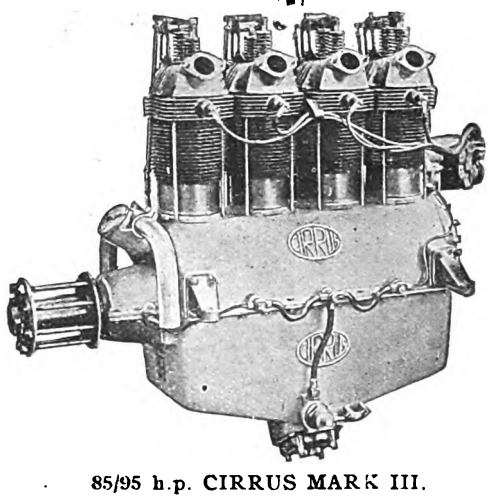
The following is an extract from his letter dated 6th March, 1930:—

"It may be of interest for you to know that I bought MOTH G-EBQW from National Flying Services with CIRRUS MK. III engine exactly one month ago.

After fifteen minutes' practice flying Lieut. J. B. Buckley, R.N., and I flew the machine straight to Le Bourget non-stop. From there to Bale and from Bale to St. Moritz where we landed in the snow on the lake.

I think I may claim a record for a MOTH with MK. III CIRRUS in getting to St. Moritz *and off* again in the snow at an altitude of 6,200 ft. with two up and luggage.

I am quite delighted with the little engine which ran splendidly at all altitudes and started up with ease after ten days of 17° of frost."



85/95 h.p. CIRRUS MARK III.

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Cables: "Ocirruso" London.

Works: Croydon.

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extends his service, he will be a skilled aircraft worker in that line of business.

Also, if he has been wise, he will have educated himself while in the Air Force, with the help of the vocational training system which has been set up by the Authorities at the Air Ministry. So he ought to have no difficulty in getting a job in the Aircraft Industry.

If he is of the right type, and is keen on flying, he may be selected to be trained as an Airman Pilot. And, if he happens to be exceptionally gifted in a variety of ways, he may be given a Permanent Commission in the Air Force. Naturally such commissions are few and far between. But if a man is of the right sort, and has enough determination and enough ability, he may win a commission.

Some Other Types.

Young men already in a business who want to get into Aviation but have some defect which prevents them from being accepted by the Air Force, should do their best to get a job in their own particular trade in one or other of the aircraft factories. Or they may get jobs as mechanics in one of the various firms which operate aircraft, either in a joy-ride concern, or in an air-taxi concern, or in an air line.

If they do not happen to be mechanics, but have only commercial experience, they may find more difficulty in getting a job. But their ability as salesmen may best be proved by their ability to sell themselves and their experience.

The only way of getting a job is to go and look for it. As in every class of work, a recommendation from a friend is useful. But just as many men have got good jobs in all lines of business by simply walking into a workshop or office and asking for a job as have ever got jobs by recommendation. Pluck, pertinacity, and ingenuity, if backed by real ability, will always find a job in the end.

The Short Service Officer.

Lastly, we come to the young man who wants to be a pilot and is not very keen on anything else. He can go to the Air Ministry and apply for a short service commission in the Air Force. If he comes up to the educational standard required (which is not so very high), and if the doctors pass him, and if he turns out to be able to fly, he then does five years' service as an officer in the Air Force. During that time, if he proves of high enough quality, and if he can pass the qualifying examinations, he may be given a permanent commission. But to get it he must be of exceptional ability.

Here again, whether he gets it or not is partly a matter of keenness, partly a matter of ability, and partly a matter of luck. But of these, luck plays the least part.

If he does not get a permanent commission, when he leaves the Force he has to hunt round for a job. But he has useful qualifications behind him. He has all the latest knowledge of modern aircraft, of modern navigation and of modern aero-dynamic ideas. The number of firms operating aircraft either on air-lines or on air survey work or on air-taxi work is steadily growing. Between two and ten years hence there will be an enormous demand for pilots. And people who want pilots will be more likely to take people straight out of the Royal Air Force than from any other source.

Furthermore, thanks to the system of vocational training already mentioned, the short service officer in the Air Force can, if he has the energy and enterprise, study any particular subject which is likely to be useful to him when he leaves. Thus, he may specialize on navigation and become a most valuable man to any aircraft operating firm. Or he may study engineering and be valuable to a factory manager. By virtue of his service he should be at the same time a good engineer and a man who knows how to handle the machines which he has helped to make.

In fact, the young man who joins the Air Force with a short service commission and regards his period of service exactly as another man might regard a period at a University, will find that the time he has spent in the Air Force has been very useful to him and will be still more useful in after life.

Even if he has some trouble in finding a job he certainly is in a position no worse than that of a young man in a good position who finds one morning that the firm with which he is employed has gone broke. And that happens every day.

The Free and Independent Pilot.

Last of all there is the young man who is resolved to be a pilot, but will not go through the workshops and will not go into the Air Force with a short service commission.

If he has money then obviously he can go and learn at any of the flying schools and even buy an aeroplane of his own and go on flying for 100 hours after he has passed for his "A" pilot's certificate, and then, if he passes the rest of the tests, he can take his "B" licence which qualifies him to fly for hire or reward.

If he gets a job as a pilot then he is lucky. Obviously air lines and other operating firms are not going to employ an amateur pilot with 100 hours' flying experience when they can get as many pilots as they like out of the Air Force who have probably had about 1,000 hours of flying experience. Nevertheless there are men who have learned to fly at their own expense and have turned out to be such exceptionally fine pilots that they have been given quite good jobs. That again is a matter of ability, personality and experience combined.

One has in mind one young man who for good reason could not get into the Air Force but was resolved to get into Aviation, and learned to fly at his own expense. A kind brother provided him with a good deal of extra flying. And ultimately he managed to get into the air survey business simply because he showed that he was thoroughly keen and did not mind what job he took on.

His was an exactly opposite case to that of a pilot who

GOING NORTH.—Machines and crews of the MacAlpine search party re-fuelling at Dubawnt Lake, N.W. Territories. From left to right: William Spence and Charles Sutton (pilots), and Longley (mechanic) of Dominion Explorers Ltd., and Paul Davis and Roy Brown of Western Canada Airways Ltd.

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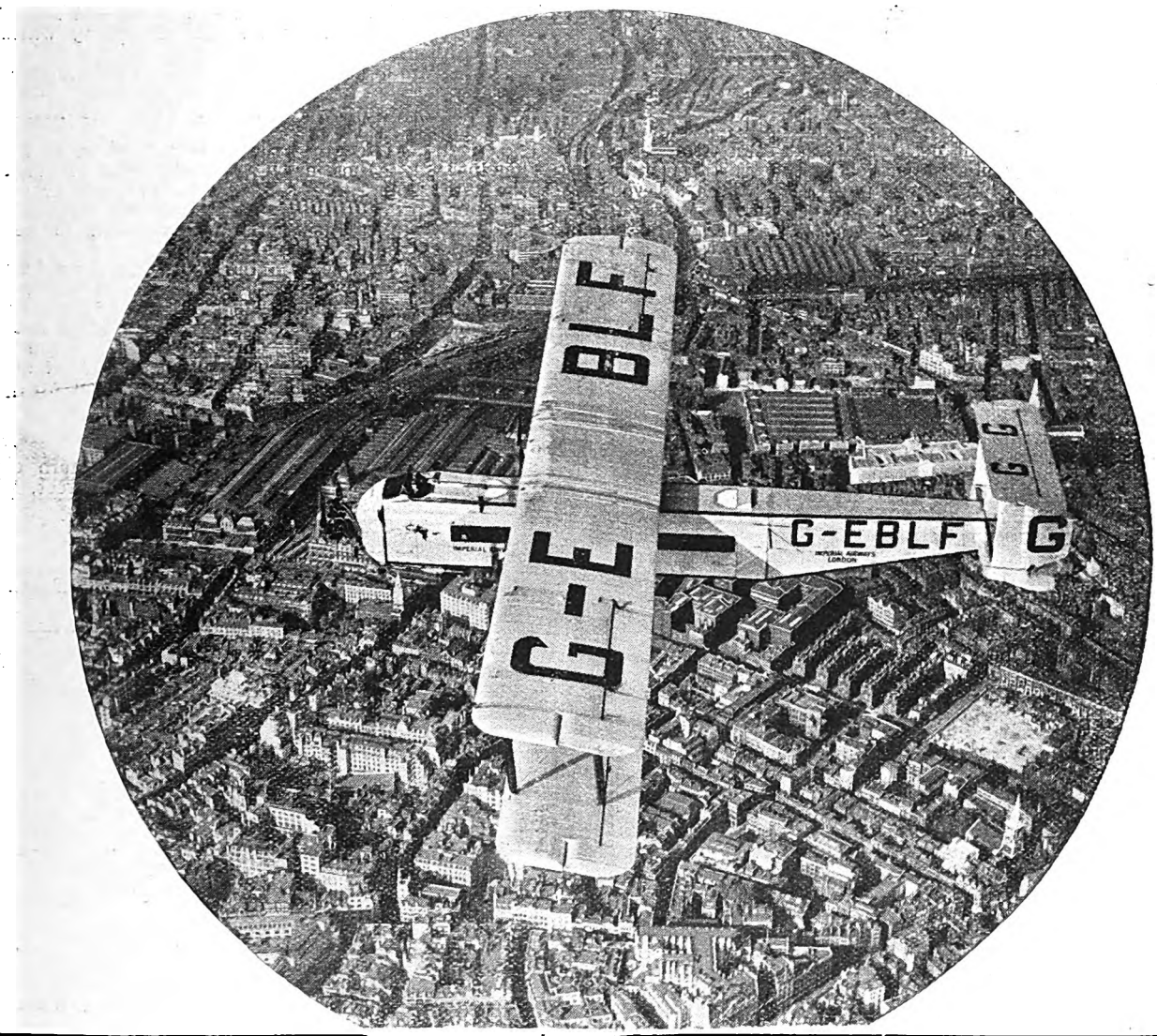

1,023,075 Argosy Miles

IN just over 4 years seven Argosies in the European Fleet of Imperial Airways Limited have flown 1,023,075 miles in approximately 11,296 hours. They have carried well over 50,000 passengers; they have crossed the channel approximately 4,200 times.

The Argosies are the safest, best paying and most easily maintained Air Liners in existence.

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left the Air Force with a high reputation as a pilot and on the strength of it was given a very good job in commercial aviation. He held it for a few months and was then fired because he held that he had been engaged as a pilot and not to do odd jobs in the particular branch of aviation in which he was engaged. If he had had the sense to do the odd jobs when he was asked he might now be holding a very important position in that same firm.

The man who is going to succeed in the World must be prepared to do anything which will help his firm, even though it has apparently nothing to do with the work in which he is engaged. If he does the more lowly jobs willingly and well, he is much more likely to find himself put onto doing the higher and more responsible work.

A Word To Parents.

Finally, a word of advice to parents. There are two objections which parents raise when their offspring suggest that they want to come into Aviation. One is that flying is so dangerous. The other is that the flying business is not a commercial proposition. Both these arguments have been brought up against every new profession that has ever come into being, so parents should remember the precedents.

The electrical business was dangerous. People used to get themselves electrocuted, or burned, or chewed up in dynamos. And it was not a paying business, because the idea of people lighting their houses with this dangerous stuff and talking to one another along miles of wire, and being driven along the road by it, was obviously foolish.

Years before that steam engineering was dangerous. Steam boilers blew up and scalded people to death. Anyhow, nobody was going to treat seriously the idea of producing force by boiling a kettle. The notion that these stinking and steaming things on rails could ever displace a respectable vehicle with four fine horses in front of it on a road was too absurd to be taken seriously. And the idea of lighting fires inside a ship to drive it across the ocean, when one was sure that either the boilers would burst and blow the ship out of the water, or the fires would set it alight, was too ridiculous to be considered.

Very much later motor-cars blew tyres off, or wheels fell off and threw people into ditches, or petrol-tanks caught fire, and all sorts of awful things happened which proved quite conclusively that motor-cars could never be considered serious competitors with railways. And the prospect of motor-making ever becoming a serious industry in competition with the building of horse-carriages and railway-coaches was quite absurd.

Somewhere about 1905 the first serious motor-bus line was put on the road. At that time one happened to be living in Birmingham, and then,—which is only twenty-five years ago,—if one got from the middle of Birmingham up the Hagley Road as far as Stanmore Road Station the event was something to be chronicled as a great achievement.

Much about the same time independent motor firms were trying to run 'buses in London. The London General Omnibus Company only used horses. Scotland Yard, the tyrannical licensing department, insisted that these motor-buses were too noisy, and that they were unreliable, and had all kinds of appalling defects. The motor experts of the period held forth against this tyranny, and proved scientifically that the 'buses of that period were as perfect as could be. And the late lamented Superintendent Bassom of the Metropolitan Police used to tell them to go home and learn to build public service vehicles instead of coming wasting Scotland Yard's time.

To-day, we have motor-coaches *de luxe*, as comfortable as the most expensive motor-cars and as reliable. And for this we largely have to thank that tyrannical licensing department.

In exactly the same way aviation is dangerous, and aircraft engineering is not, as yet, a commercial proposition except when building aircraft-of-war for our own or other Governments. And, our Air Ministry's licensing departments are just as tyrannical as Scotland Yard used to be to motor-buses and the early taxi-cabs.

History will repeat itself in this as it has done in the past. In a few years we shall have aeroplanes which pay as motor transport has done. The building of aircraft will pay just as does any other successful and modern branch of engineering. And we, as is our way, will make the Best Aeroplanes in the World. We have always grumbled about the policies of our Governments, but, at the finish we have always come out on top.—C. G. G.

THE ROYAL AERO CLUB.

The Annual General Meeting of the Royal Aero Club will be held at the Club Premises, 3, Clifford Street, W.1, on Wednesday, Mar. 26, at 20.30 hrs.

A House Dinner will be held at the Club prior to the Meeting, at 19.30 hrs. The price of the dinner is 6s. Members wishing to attend are requested to notify the Secretary. The Right Hon. Sir Philip A. G. D. Sassoon, Chairman of the Club, will preside.

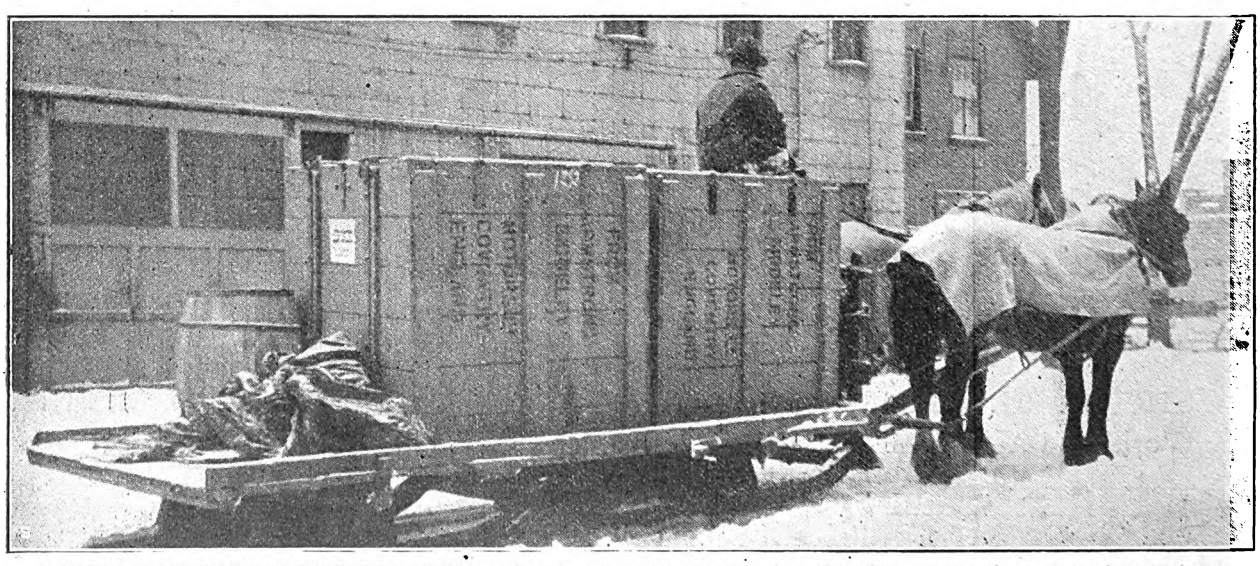
The following Members have been nominated for the nine vacancies on the Committee:—

1. Acland, Capt. H. E. P. D.
*2. Brancker, Air Vice-Marshal Sir W. S., K.C.B., A.F.C.
*3. Broad, H. S.
4. Cooper, Major A. Q., D.S.C., A.F.C.
*5. Darwin, Major C. J. W., D.S.O.
*6. Downes-Shaw, A. H.
7. Du Boulay, Flt. Lt. G. G. H.
*8. Goodfellow, Major A. R.
*9. Lloyd, Col. F. Lindsay, C.M.G., C.B.E.
10. Lord, John.
11. Marix, Sq. Ldr. R. L. G., D.S.O.
*12. Moore-Brabazon, Lieut.-Col. J. T. C., M.C.
*13. O'Gorman, Lieut.-Col. M., C.B.
*14. Petre, Major H. A., D.S.O., M.C.
15. Plevins, St. John T.
16. Preston, R. L.
17. Samson, Air Commodore C. R., C.M.G., D.S.O.

[Those marked with an asterisk are retiring members who offer themselves for re-election.]

By the time this copy of The Aeroplane is in the hands of its readers voting papers will have been sent to the members of the Royal Aero Club so that they may elect the new Committee-men.

This year will be even more important than last year for the Aero Club, because, whereas last year there was all the credit attaching to the running of the Schneider Trophy Contest to keep the Club before the public eye, this year there is nothing except such competitions as the Club itself may organise to give it prestige and that respectable form of publicity which is necessary to the life of any society which



IN THE AIRCRAFT INDUSTRY.—"They also serve who only stand and wait." A consignment of Armstrong Siddeley Motors outside the firm's Canadian branch establishment.

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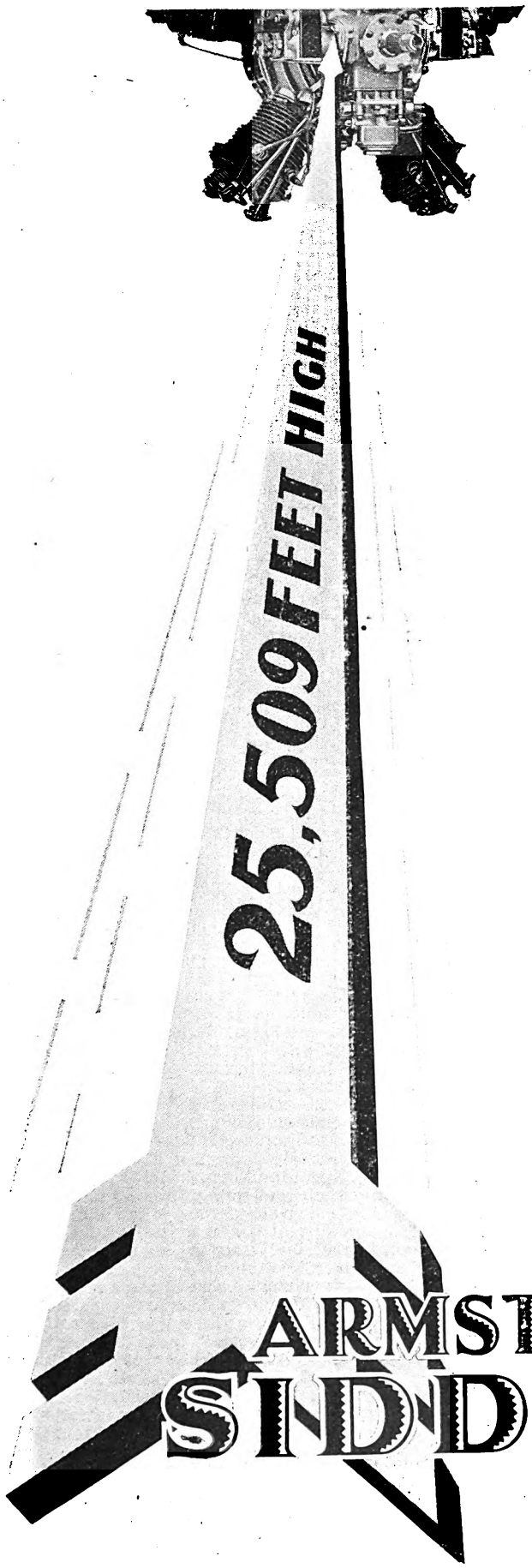

GENET SUCCESS IN FRENCH PLANE

AN Albert monoplane fitted with an Armstrong Siddeley Genet engine recently made a successful attack on the altitude record for light aircraft, single seaters, 3rd category, 350 Kgs., the official figure being 7,730 m. (25,509 ft.).

The engine was standard and ran for one hour fifty minutes at 2,200 r.p.m. The total duration of the flight lasted 2 hours 10 minutes at temperatures varying between plus 10 degrees and minus 35 degrees.

ARMSTRONG SIDDELEY

MOTORS LIMITED,
COVENTRY, ENGLAND
and
10, Old Bond Street, London, W.1.

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governs a sport. Therefore there is the greater need this year to elect Committee-men who are game to do lots of honorary work and whose interests are centred in the Sport of Flying and not in trade or politics.

The list shows that seventeen members have been nominated for election. There are nine vacancies on the Committee—caused by the rule which decrees that half the Committee shall resign each year. Consequently eight names have to be eliminated from the list of seventeen, and the difficulty is to choose which eight to eliminate. All the candidates are so good that the pity is that we cannot have all of them on the Committee. But the great thing is to choose men who are, first and foremost, sportsmen.

So far as four of the candidates are concerned the course is fairly clear. Mr. Hubert Broad, Sq. Ldr. C. J. W. Darwin, Mr. A. H. Downes-Shaw and Mr. Alan Goodfellow were recently co-opted to the Committee to take the places of Mr. Goodman Crouch and Mr. E. J. B. How, who went abroad, and of the late Colonel Dunville and the late Lord Edward Grosvenor. These members of the Club have already proved themselves keen and useful members of the Committee although they have been co-opted so recently that they have only had the opportunity of attending very few meetings.

They all represent the sporting side of flying and they are all keen pilots. Sq. Ldr. Darwin and Mr. Broad, although connected with trade firms, are of real value because they represent what for a better phrase one must call the "expert" members of the Committee. Mr. Goodfellow and Mr. Downes-Shaw represent the Light Aeroplane Clubs and private owners, two interests for which the Royal Aero Club mainly exists. Therefore one does suggest that these four should be re-elected so that they may continue for another twelve months the work which they have so well begun.

The only other individual whom one feels called upon to advocate strongly is Air Commodore C. R. Samson. He is one of the best all-round sportsmen in this country, as well as one of the best pilots. He has absolutely no trade or political interests of any kind, and he is in the fortunate position of being able to afford time to do honorary work. Though he has been flying for close on twenty years he is still as good a pilot as anybody in the game, and he would be a most valuable member of the Committee.

For the rest, one can only say that those members of the Committee who are retiring whose names are indicated by an asterisk in the list have all done good work and deserve re-election.—C. G. G.

AVIATION RECORDS.

As from Jan. 1, 1930, the *Fédération Aéronautique Internationale* will only recognise as World's Records the best performances under the following headings:—(A) Duration, (B) Distance in a closed circuit, (C) Distance in a straight line, (D) Height, (E) Speed.

All other records are now known as International Records.

THE GUGGENHEIM FUND DISSOLVES.

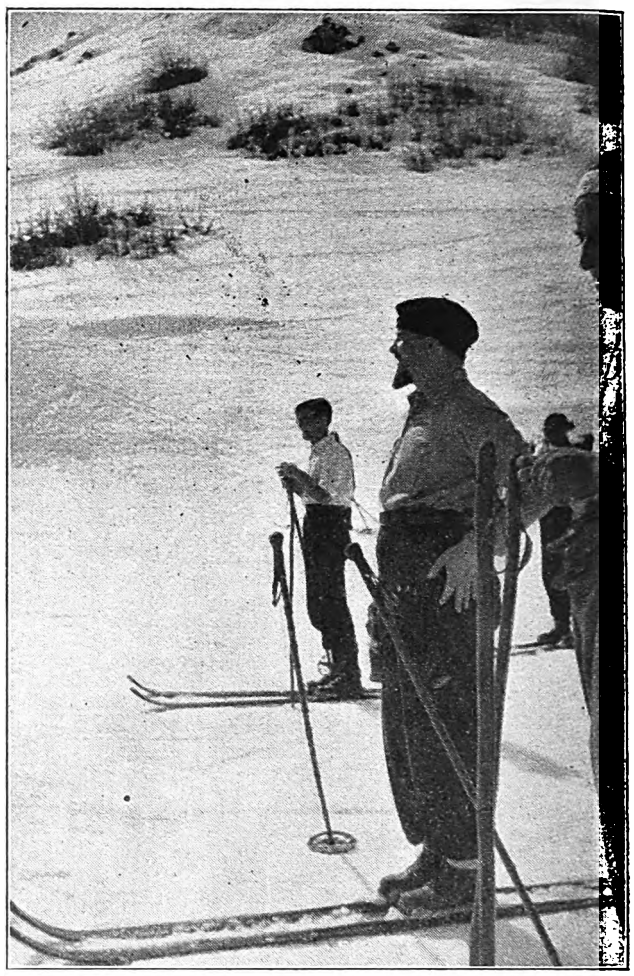
Official information has been received that the Daniel Guggenheim Fund for the Promotion of Aeronautics has ceased to exist as from Feb. 1, 1930, after having accomplished the purposes for which it was founded in 1926 by Mr. Daniel Guggenheim.

Mr. Harry F. Guggenheim, President of the Fund, has recently been appointed Ambassador for the United States at Havana, Cuba.

The Daniel Guggenheim Fund has done an enormous amount of good work for the promotion of aviation. It has endowed Chairs of Aeronautics and Aeronautical Libraries in a number of the Universities in the States, it has made a handsome donation to the Royal Aeronautical Society in this country, it has paid for many interesting and expensive experiments in America, and lastly but by no means least, it has given a prize of £40,000 for a Safety Aeroplane Competition.

Judged as an international competition this was a complete failure, and its failure served to demonstrate the extraordinary conservatism and lack of enterprise of aircraft manufacturers of all nations. The fact that the only two competitors who were able to pass even the qualifying tests were one British and the other American did at any rate demonstrate the complete superiority of Anglo-Saxon aircraft designers, constructors and pilots over the rest of the World.

The controversy which followed the award of the prize was most unfortunate but it was certainly no fault of Mr. Harry Guggenheim or of the Committee of the Fund. Everybody will wish His Excellency, Mr. Harry Guggenheim, U.S. Ambassador to Cuba, every success in his new office and will hope that in spite of his onerous duties he may continue to take a practical interest in aviation.—C. G. G.



ON SKIS.—General Balbo, the Italian Air Minister, taking ski-ing lessons at Pescocostanzo in the Apennines, in the heart of the Abruzzo, within easy reach of Rome. Experiments are being made in this area with aircraft on skis with a view to organising Alpine (or Apennine) aviation for commercial or tourist purposes, and for Army Co-operation with the famous Alpini battalions.

THE ITALIAN AIR ESTIMATES.

The Rome Correspondent of *The Times* reports that General Balbo, the Italian Minister for Air, in his speech on the aviation estimates, dealt briefly with Italian civil aviation. General Balbo said that no new air lines would be created but that traffic would be intensified on those which now existed.

He then said with reference to military aviation that they had resolutely tackled the question of bombing machines, which constituted the basis of their aerial forces. So far as bombing at sea was concerned, the S.55 [this is the twin-hulled Savoia flying-boat with two 500 h.p. Isotta-Fraschini Asso engines.—Ed.] had now proved so satisfactory that it would be the definite standard type for some years to come.

As for bombardment on land, Italy would have machines with characteristics superior to those of machines of other European nations, if they were granted the means to produce. The same was true also of their machines for chasing the enemy. [Known in America as pursuit-ships.—Ed.]

General Balbo then devoted much time to insisting that "an aeronautical conscience" must be created in Italy. Aviation was the terrible unknown of the future war, and because of the technical progress made in it, it was essential to increase the Budget. General Balbo gave a number of figures showing the expenditure on aviation and other military forces in countries such as Great Britain and France.

The total Italian aviation estimates were for an expenditure of 718,000,000 lire [nearly £8,000,000].

"The example of our powerful neighbour [France] was to stimulate us finally to embark upon a policy of adjustment between the expenditure on aeronautics and the expenditure on other military objects." Italy was perhaps the most vulnerable country in Europe from the air and could only be saved from ruin by a strong air force. The speech was loudly cheered.

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FOR

ESTHONIA

The Esthonian Government have placed an order with the Bristol Aeroplane Co. Ltd. for the supply of twelve "Bristol" Bulldog single-seater fighters.

The order was obtained in the face of keen competition from manufacturers all over Europe, but Esthonia, following the example of Great Britain, Latvia, Australia and other countries in which Bulldogs are in service, decided in favour of the Bulldog.

This choice was dictated not only by reason of the outstanding performance of the Bulldog, but also because of the excellence of its design and all-steel construction, its great strength, and its ease of maintenance and upkeep.

From Latvia, as a result of the excellent results obtained from Bulldogs previously supplied, a further order for Bulldogs has been obtained.

Telegrams: Aviation, Bristol.

Telephone: 3906 Bristol.

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THE ROYAL AIR FORCE.

The London Gazette.

Air Ministry, March 11.

ROYAL AIR FORCE.

Air Marshal Sir E. L. Ellington, K.C.B., C.M.G., C.B.E., is appointed Principal Air Aide-de-Camp to the King (Feb. 27) (vice Air Chief Marshal Sir J. M. Salmond, K.C.B., C.M.G., C.V.O., D.S.O.).

GENERAL DUTIES BRANCH.—The following Plt. Offs. are promoted to the rank of Flg. Off.:—E. L. Mole (July 14, 1929); T. R. Hope (Jan. 14); R. B. Councell, J. A. C. Stratton, E. J. Laine (Jan. 28).

Flg. Off. H. T. Andrews is transferred to the Reserve, Class A (Mar. 1); Lt. O. C. Jones, R.M., Flg. Off., R.A.F., ceases to be attached to the R.A.F. on return to duty with the Royal Marines (Mar. 1).

MEDICAL BRANCH.—Air Commodore J. McIntyre, M.C., M.B., B.Ch., is appointed Director of Medical Services, Air Ministry (Mar. 1); Flt. Lt. R. Thorpe, M.R.C.S., L.R.C.P., is granted a perm. comn. in this rank (Mar. 12); Flt. Lt. (Quartermaster) W. P. Conolly is promoted to the rank of Sq. Ldr. (Feb. 21); Flg. Off. P. B. L. Potter, M.B., Ch.B., is promoted to the rank of Flt. Lt. (Mar. 5); Maj. A. A. McMullan, L.D.S., R.F.P.S. (G) (Army Dental Corps), is granted a temp. comn. as a Sq. Ldr. (Dental) on attachment to the R.A.F. (Feb. 21); Flt. Lt. S. A. McCormack, L.D.S. (Capt., Army Dental Corps), relinquishes his temp. comn. on return to Army duty (Feb. 21).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—A. Dewsbury is granted a comn. in Class B as a Plt. Off. on probation (Mar. 4); J. B. Harvey is granted a comn. in Class C as a Flg. Off. (Mar. 4). The following Flg. Offs. of the Special Reserve are promoted to the rank of Flt. Lt. (Mar. 11):—D. G. Allison, T. H. Worth. The following are transferred from Class A to Class C:—Flt. Lt. L. R. L. Brown, D.F.C. (Mar. 6); Flg. Off. L. A. Lewis (Feb. 20); Flg. Off. A. J. Thompson (Mar. 4).

Appointments.

Week ending March 17.

GENERAL DUTIES BRANCH.—Wing Commanders G. W. Robarts, M.C., to R.A.F. Base, Gosport, for Administrative duties, 1/3. L. T. N. Gould, M.C., to Air Ministry (D.O.S.D.), for Air Staff (Signals) duties, 17/3. H. V. Champion-de-Crespigny, M.C., D.F.C., to No. 2 (Indian Wing) Station, to command, 25/1.

Squadron Leaders C. R. Cox, A.F.C., to No. 6 Sqdn., Middle East, 21/2. V. R. Gibbs, D.S.C., to Armoured Car Wing, 'Iraq, 21/1. T. Q. Studd, D.F.C., to No. 23 Group H.Q., Grantham, 2/3. A. McR. Moffatt, to Station H.Q., Manston, 1/3. H. J. Roach, A.F.C., to No. 10 Group H.Q., Lee-on-Solent, 26/2.

Flight Lieutenants A. L. A. Perry-Keene, to H.Q., Wessex Bombing Area, Andover, 3/3. D. Drover, to R.A.F. Training Base, Leuchars, 3/3. W. N. Plenderleith, to No. 36 Sqdn., Donibristle, 10/3. A. J. Rankin, A.F.C., to No. 30 Sqdn., 'Iraq, 8/2. A. E. Lindon, M.B.E., to No. 4 F.T.S., Middle East, 10/2. H. M. Groves, to Aircraft Depot, India, 2/2.

Flying Officers P. A. Moritz, No. 45 Sqdn., Middle East, 17/2. A. Maughan, to R.A.F. Depot, Uxbridge, 18/1. A. H. Montgomery, to R.A.F. Practice Camp, North Coates Fitties, 5/3. A. M. D. Howes, to R.A.F. Practice Camp, Sutton Bridge, 5/3. H. H. Leech, to Experimental Section, R.A.E., S. Farnborough, 3/3. R. A. Whyte, to No. 7 Sqdn., Worthy Down, 3/3. J. McGuinness, to No. 35 Sqdn., Bircham Newton, 26/2.

Pilot Officers E. Esmonde, to No. 43 Sqdn., Tangmere, 3/3. W. N. H. Banks, to No. 216 Sqdn., Middle East, 6/2. S. J. H. Carr, to No. 55 Sqdn., 'Iraq, 7/2.

MEDICAL BRANCH.—Squadron Leader A. A. McMullan (Dental), to H.Q., R.A.F., Middle East, 1/3.

Flying Officer J. J. Corcoran, to No. 47 Sqdn., Middle East, 1/3.

STORES BRANCH.—Flight Lieutenants H. B. S. Ballantyne, to Station H.Q., Worthy Down, 3/3. R. V. J. S. Hogan, to School of Photography, S. Farnborough, 1/3.

Flying Officer C. I. Fry, to Base Transport Section, 'Iraq, 6/2.

ACCOUNTANT BRANCH.—Flight Lieutenant E. J. Grout, to Station H.Q., Donibristle, 13/2.

The Principal Air A.D.C. to the King.

The Air Ministry announces the appointment of Air Marshal Sir Edward Leonard Ellington, K.C.B., C.M.G., C.B.E., as Principal Air Aide-de-Camp to the King (vice Air Chief-Marshal Sir John Maitland Salmond, K.C.B., C.M.G., C.V.O., D.S.O.).

Fatal Accidents.

In the House of Commons on Mar. 13 in reply to a question by Mr. W. G. Hall, the Under-Secretary of State for Air gave the following information regarding the fatal accidents in the R.A.F. in 1929. (The figure in brackets is the number of deaths involved.)

January, 2 (4); February, 3 (4); March, 2 (3); April, — —; May, 5 (6); June, 3 (4); July, 5 (6); August, 2 (5); September, 2 (2); October, 5 (5); November, — —; December, 2 (3). Total, 31 accidents and 42 deaths.

The High Speed Flight.

In the House of Commons on Mar. 12, Mr. Granville asked the Under-Secretary of State for Air whether it was the intention of his Department to reconstitute the high speed flight; and if so, whether he intended to restrict the selection of pilots to unmarried officers and men?

Mr. Montague said that it was not contemplated at present that the high speed flight would be reconstituted. High speed research was, however, being continued, and two officers (one trained and one under training) were to be appointed for this purpose to Felixstowe. The answer to the last part of the question was in the negative.

Auxiliary and Reserve Training.

Annual training camps of Auxiliary Air Force (Territorial) Squadrons and of Cadre (Special Reserve) Squadrons for this year have been arranged as follows:—

Auxiliary Air Force, No. 600 (City of London) Bomber Squadron, at Tangmere, near Chichester, Aug. 3-17; No. 601 (County of London) Bomber Squadron, at Lympne, near Hythe, Aug. 3-17; No. 602 (City of Glasgow) Bomber Squadron, at Leuchars, July 18-Aug. 1; No. 603 (City of Edinburgh) Bomber Squadron, at Manston, near Ramsgate, July 13-27; No. 605 (County of Warwick) Bomber Squadron, at Manston, Aug. 3-17.

The R.A.F. and the Merchant Service.

The Times correspondent in Southampton, in a message dated Mar. 12, states:—

A scheme has been put forward for closer co-operation between the coastal patrols of the Royal Air Force and ships of the merchant fleet. It has already been given a trial by the officers of large steamers sailing out of Southampton and by the Calshot air station.

FLT. LT. H. W. ST. JOHN, D.F.C., speaking to the members of the Southampton Master Mariners' Club, said that the first trials of visual signalling from the aircraft to liners had been fairly successful. The class of visual signalling received from the ships had been very good, and the way in which the lamps had been focussed satisfactory. He pointed out that wireless would not provide the necessary secrecy in time of war, and that was why they were using visual signals. From the point of view of the special work of coastal reconnaissance, the closer liaison between the two Services was most desirable, and he suggested that super-flying-boats might in the course of time form part of the equipment of the shipping companies' fleets, so that the signal tests might prove of mutual advantage.

In the discussion CAPTAIN C. P. S. PEARCE said that it frequently happened that the officer signalling from the ship did not know whether the message was understood, and it had happened that a ship had had to go astern to avoid a collision with a seaplane. He suggested that it would be a good thing if there could be some method of letting the ships know more about the proposed operations of the aircraft.

FLT. LT. ST. JOHN, replying, said that the air pilots knew they had to keep clear of the big ships, and it was perfectly reasonable that a machine weighing about five tons and travelling at about 60 knots before taking off should make doubly sure of not hitting a big ship or getting into her wake. He was afraid, however, that they had not always realised that they were putting the big ship to any inconvenience; he would make representations on the point to the Commanding Officer at Calshot.

R.A.F. Bands.

In the House of Commons on Mar. 11, in reply to Mr. Hore-Belisha, the Under-Secretary of State for Air said that the King's Regulations and Air Council Instructions for the R.A.F. allowed Air Force bandsmen to accept individual private engagements as musicians in civilian orchestras, subject in all cases to the approval of their commanding officer, who was responsible that the engagements were of a proper and non-political nature, and that they were not connected with any strike or lock-out of civilian musicians and that the remuneration was not lower than that usually received by civilian musicians for similar engagements.

[An interesting fact in connection with R.A.F. Bands is that the band of one of the smaller Commands of the R.A.F. is so good and so popular that it is regularly booked for the municipal affairs of a certain industrial town and is paid exactly double the rate of any other band of the same size.—C. M. MCA.]

The R.A.F. Station at Milton.

In the House of Commons on Mar. 13, in reply to a question by Major Glyn, the Under-Secretary of State for Air said that no scheme of reconstruction at Milton was contemplated at present. The buildings were of war-time construction, and although they were not entirely satisfactory, the accommodation at the station was reasonably good. In any case reconstruction must wait until financial considerations allowed and more pressing needs had been satisfied.

[The Unit at Milton is No. 3 Stores Depot.]

Special Assessments.

The following officers have been awarded the special assessment "Distinguished Pass" on completion of a course of *ab initio* flying training at the R.A.F. Training Base, Leuchars:—

Lieutenants, R.N., Flying Officers, R.A.F.—A. G. Poe, P. Somerville, S. W. D. Colls, H. M. King, J. W. Hale, D. R. C. Hodson, A. C. R. Duvall.

Notations have been made in the official records of the officers concerned.

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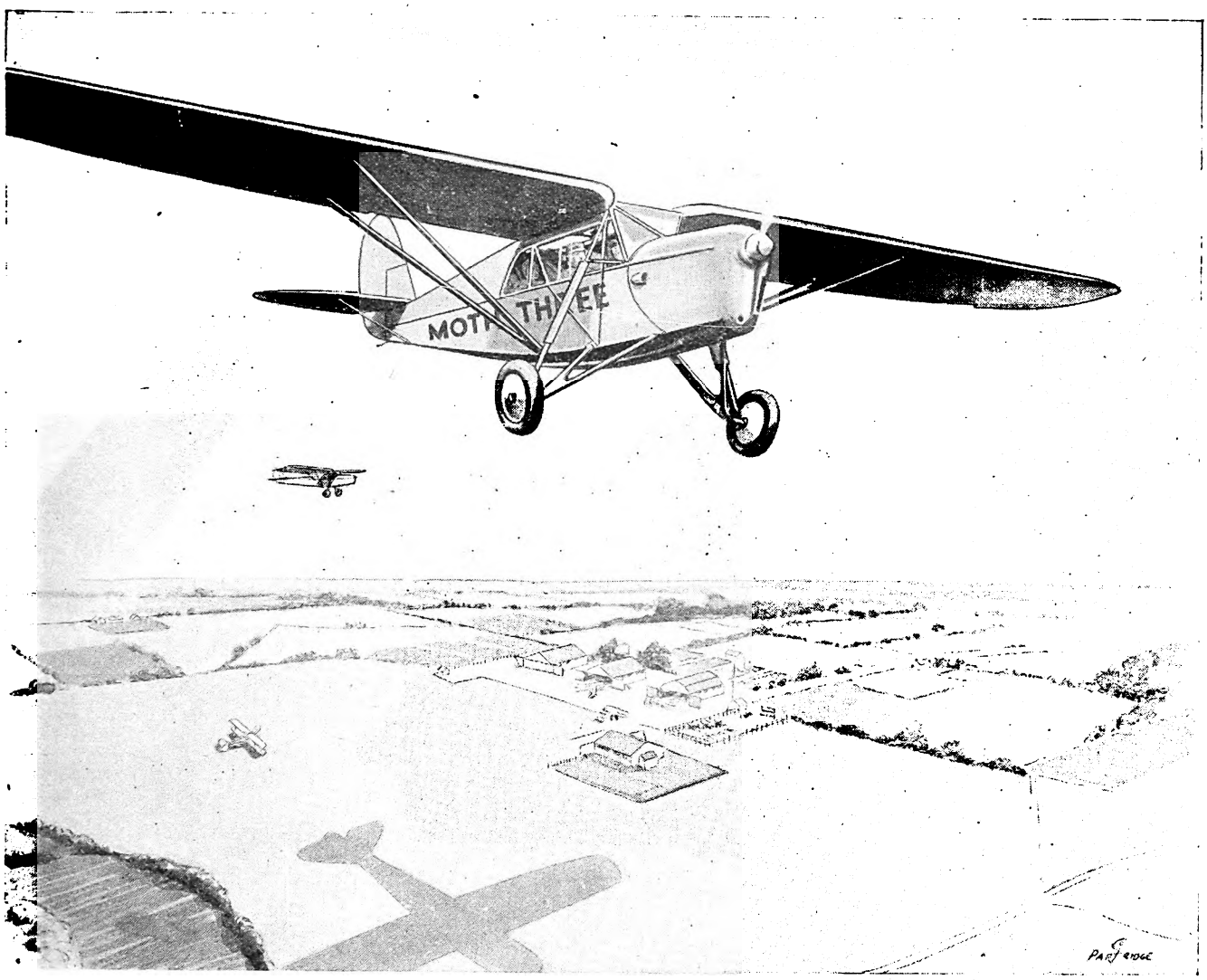

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EXTREME ECONOMY. Although constructed essentially up to a standard, and not down to a price, the Moth Three combines a reasonable first cost with running expenses only fractionally greater than those of the well-known Gipsy Moth, while the principles of its design obviate all rigging adjustments.

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had meant a corresponding decrease in appropriations-in-aid under that head from the Admiralty. The two factors exactly balanced, and made no difference in the total of the Supplementary Estimate.

The deficit of £40,000 on Vote 3, sub-head L, was due to the rise of 2½d. per gallon in the price of petrol at home.

Sir Samuel Hoare said that so far as he knew there had never been any question that the grant that India was paying to-day was a good deal less than it should be. If there were no British Air Force in India, and the Government of India had to form their own Air Force, they would be paying a much higher amount per head than the actual amount which in recent years they had been paying to the Air Ministry in respect of the Air Force. He hoped that a settlement would be made very soon.

With regard to the super-cut he had no criticism to make, and he thought that this Estimate should go through without undue criticism or delay.

Mr. Mander hoped that the Air Minister had not been saving at the expense of the light aeroplane clubs.

Capt. Bourne hoped that the Air Ministry would stand to their ground and try and get £80 per officer and man out of the Indian Government.

Rear-Admiral Sueter suggested that the Air Ministry should place their orders earlier in the year and not pile them all on the Industry at the end of the year. He deplored the saving of £39,000 on Civil Aviation.

Mr. Hardie wanted more information about the two airshisps.

Mr. Montague said that he appreciated the value of placing orders as early as possible from the standpoint of the employment of labour as well as the expenditure of money in endeavouring to make an even flow but in the case of a highly technical service there were more difficulties than there might otherwise be.

The saving on airship development was due to the postponement of the overseas flights. This postponement had saved £70,000, which had been offset by increased expenditure on R.101 to the extent of £31,000.

The surplus under Civil Aviation subsidies had been due to the decreased subsidy to Imperial Airways on the London to India route. The money had not been earned owing to accidents.

Group Captain E. F. Briggs.

Group Captain E. F. Briggs, D.S.O., O.B.E., R.A.F., whose retirement from the R.A.F. is dated Feb. 13, 1930, was born in 1882 and educated at Clifton, at Blundell's School, Tiverton, and at Bristol University. He entered the Royal Navy as an Engineer Sub-Lieutenant from Keyham in 1905 and was promoted to Engineer Lieutenant in 1908. He was one of the first engineer officers on the instructional staff when Osborne was made a Naval College.

He learned to fly on a Short Biplane at Eastchurch and his Royal Aero Club Certificate, No. 265, is dated July 30, 1912. In October, 1912, he was appointed to the Royal Flying Corps (Naval Wing) as a Flying Officer and was promoted Flight Commander in April, 1913, and Squadron Commander in November, 1913.

His first period of service in aviation was spent at Eastchurch, where he did work which had far-reaching after-effects on Service flying. And he, with Engineer-Lieut. Aldwell, and Engineer Lieut. Randall, supported with all the weight of their engineering training and status the policy of Captain Murray Sueter at the Admiralty which resulted in Naval orders for aircraft going to the Aircraft Trade when the Royal Aircraft Factory was doing its utmost to get for itself a monopoly of aircraft manufacture.

When the Royal Naval Air Service was formed in July, 1914, he was appointed Squadron Commander. And shortly before that he distinguished himself by breaking the British height record.

On the outbreak of War he was posted to the Eastchurch Squadron, R.N.A.S., the first of the Naval Air Units to be sent abroad. In November, 1914, he took part in the raid on the Zeppelin Sheds at Friedrichshafen, which was organised by Lieut. Pemberton Billing, then R.N.V.R. The operation is described in a Memorandum from the Director of the Admiralty Air Department which was published in the *London Gazette* of Dec. 31, 1914, and reads:—

On Nov. 21, 1914, Squadron Commander E. F. Briggs, Flight Commander J. T. Babington, and Flight Lieutenant S. V. Sippe, Royal Navy, carried out an aerial attack on the Zeppelin Airship sheds and factory at Friedrichshafen on Lake Constance. Leaving French territory shortly before 10 a.m. they arrived over their objective about noon, and, although under a very heavy rifle fire, machine-gun and shrapnel fire from the moment they were sighted, they all three dived steeply to within a few hundred feet of the sheds, when they released their bombs—in all eleven.

Squadron Commander Briggs was wounded, brought down and made a prisoner, but the other two officers regained their starting point after a flight of more than four hours across hostile country under very bad weather conditions. It is believed that the damage caused by this attack includes the destruction of one airship and serious damage to the larger shed, and also demolition of the hydrogen-producing plant, which had only lately been completed. Later reports state that flames of considerable magnitude were seen issuing from the factory immediately after the raid.

On Jan. 1, 1915, the *London Gazette* announced that Squadron Commander Briggs had been appointed a Companion of the Distinguished Service Order. Actually the damage done by the raid was small, but the moral effect was great, and caused the withdrawal of several thousands of men and much artillery from the fighting areas for the defence of Friedrichshafen against possible future raids,—which, unfortunately, were never made.

In April, 1917, he escaped from Germany while being transferred from one prisoners-of-war camp to another. Very soon after his return he was posted to Isle of Grain, where, immediately after his arrival, he took to vigorous flying again, and demonstrated his ability by flying to Eastchurch in a minute aeroplane, called the Grain Kitten, which was smaller than any light aeroplane of the present day and could only be flown by a very clever pilot,—which was a fine feat for a man who had just returned from over two years in a war prison.

Thereafter he served at home and in the Mediterranean, where he did continual service of a high order till the end of the War.

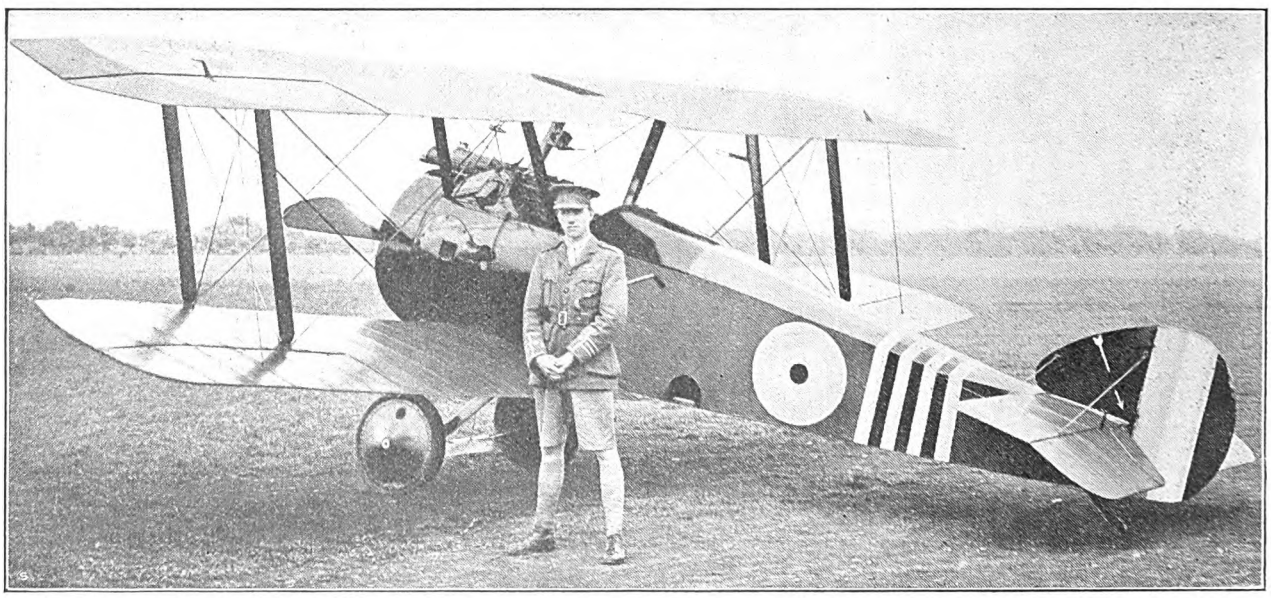
He was awarded the O.B.E. in June, 1919, and a Bar to the D.S.O. in December, 1919. His foreign decorations include the Legion of Honour (Chevalier) France, and the Croix de Guerre with Palm.

In August, 1919, his name was removed from the Navy List on appointment to a permanent commission in the R.A.F. with the rank of Wing Commander. In 1920 he was appointed Deputy Director of Design at the Air Ministry.

He was promoted Group Captain in January, 1922, and in October, 1922, he was appointed to command the Basrah Group, 'Iraq. In January, 1924, he was appointed to Headquarters, 'Iraq Command, for Technical Staff Duties.

In October, 1924, he was restored to the Home Establishment and appointed to Headquarters, Inland Area, for Engineer Staff Duties.

His retirement will be deeply regretted, for he has always been respected by all who have served with or under him,



A MEMORY.—The late Major W. G. Barker, V.C., D.S.O., M.C., with his Sopwith Camel, photographed in Italy in 1918. An obituary of this distinguished officer appears in the Personal Notices at the end of this paper.

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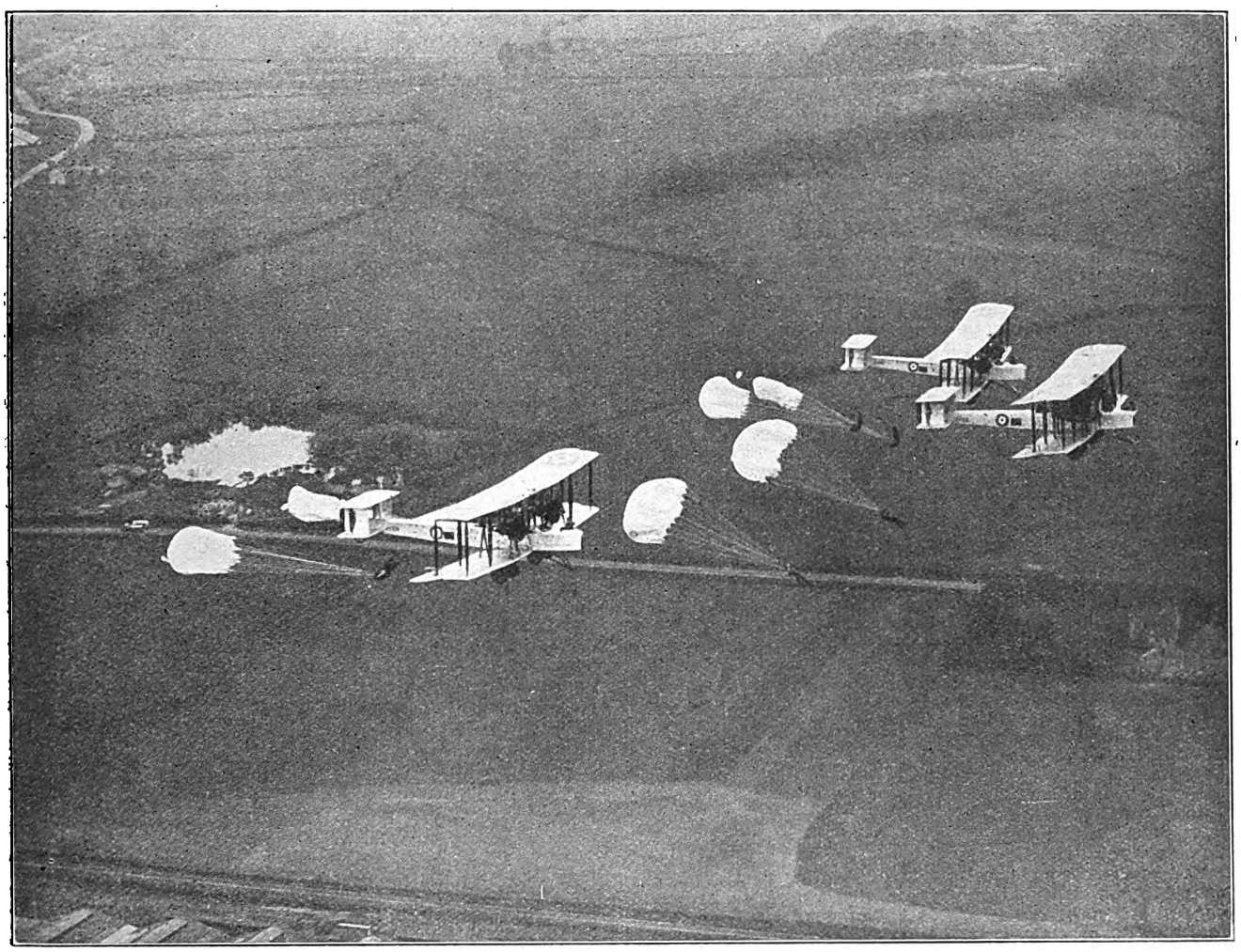
"SAFETY IN THE AIR——EVERYWHERE."



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and his personal charm has won for him the affection and regard of all ranks, apart from the admiration due to his gallantry in action and his skill as a pilot, both of which have been proved to be of a high order.

All will hope that his engineering ability and experience may not be lost to British Aviation and that suitable scope for his activities may soon be found in civil life.

A Caterpillar Padre.

The following is taken from *The Sphinx* of Feb. 1, 1930:—

The Royal Air Force has had many epics since its formation, and many or most of them have become known to the world, not through any tendency on the part of the officers and men to vaunt their exploits, but rather through the ubiquity of the journalist and his thirst for sensations. There was another such epic in Egypt the other day, on Thursday of last week to be precise, when Flt. Lt. V. J. Somerset-Thomas and the Rev. K. C. H. Warner (Chaplain, R.A.F.) made a descent in parachutes from a height of between a thousand and fifteen hundred feet, during a local flight over Abu Sueir.

When at that approximate altitude trouble developed with the propeller, and there was nothing for it but to leap. They leapt. There was a thirty mile wind blowing at the time and the padre was consequently dragged for some distance after touching *terra-firma* and badly scratched. His companion was somewhat less bruised. Subsequently the padre held a service,—a sky-pilot in real truth.

There is this marked difference between descents by parachute at home and out in Egypt. The rarity of the atmosphere over the desert makes the descent far more speedy, so that one may hit the ground with sufficient velocity to do damage. Also a bigger parachute has to be employed to make up for the lack of sufficient atmospheric resistance.

[Congratulations to the only Reverend member of the Caterpillar Club.—The last sentence of the story is not true, but the rest is quite accurate.—ED.]

A Political Puzzle.

The following paragraph appeared in *The Times* on Mar. 13:—

Soviet Press reports state that the Zeidi Imam Yahya of Sana' in the Yemen has sent to the Soviet Government a present of two leopards and one monkey, which will be placed in the Zoological Gardens in Moscow.

From this we may judge that this unpleasant old gentleman is not pleased with us, in spite of all that the R.A.F. has done to pacify him.

Or can it be that the paragraph is an allegory and that, in view of a certain curious juxtaposition of paragraphs in *The Times* of late, the Imam Yahya, a man of great wisdom, has in fact sent to the U.S.S.R. his leading newspaper proprietor and a couple of his leading local politicians, in the hope that they will never come back to trouble him?

Yet another puzzle is how he maintains communication with Moscow from his mountain top, where, according to one who has been there, R.A.F. bombers go up to 12,000 feet and drop bombs on the Imam's fortress 500 feet below.

Our Automatic Air Force.

The exploits of George, the R.A.F.'s automatic pilot, are apparently about to be seriously challenged. According to *The Felixstowe Foghorn*, a certain R.A.F. Station has on its strength an automatic observer.

Henry, as he is called, is still undergoing a course of training and the exact nature of his future duties has yet to be determined. One understands that he is more amenable to discipline than his cousin George.

So far there is no fresh news from George's cousin Alfonso, except that, like the Children of Israel in much the same area, his seed have increased and multiplied exceedingly, and that nurses have been engaged in quantities from the Royal Aircraft Nursery. One gathers that in spite of their tender care, infant mortality has been high, and that the surviving children are inclined to be disobedient.

The R.A.F. Staff College Club.

The charge per head for the R.A.F. Staff College Club dinner (Mar. 21 at the Savoy Hotel), exclusive of wine during dinner, will be 18s. 6d. This charge will include the cost of the band, printing, gratuities, and other expenses in connection with the dinner.

In previous years the cost of such items has been met from club funds, but it has been found necessary to discontinue this practice.

Officers intending to be present at the dinner are requested to forward a cheque as soon as possible to the Hon. Secretary, R.A.F. Staff College Dinner Club, Andover.

No. 28 Squadron Re-Union.

The half-yearly re-union of No. 28 Squadron (R.A.F.) Old Boys' Association will be held on April 5 at 6.30 p.m. at Slater's Restaurant, 34, High Holborn (near Chancery Lane Tube Station). Tickets are 3s. single and 5s. 6d. double and include refreshments.

Those who wish to attend should write to C. T. Hodges, 102, Camden Street, N.W.1, and state the number of tickets they require.

The Re-Union takes the form of a Whist Drive and Dance with a few musical items.

The Association is open to members of the post-War 28 Squadron, who are invited to join.

Inter-Service Rugby Football.

The following have been selected to represent the R.A.F. against the Army at Twickenham on Mar. 22:—

1. Plt. Off. G. M. Ievers, full back (No. 2 F.T.S., Digby); 2, Plt. Off. G. R. White, right wing (No. 2 F.T.S., Digby); 3, Flg. Off. J. R. H. Pott, right centre (No. 3 F.T.S., Grantham); 4, Flg. Off. J. G. Llewellyn, left centre (No. 58 Sqdn., Worthy Down); 5, Plt. Off. R. D. Cotton, left wing (No. 19 Sqdn., Duxford); 6, Flt. Lt. R. V. M. Odbert, stand off (R.A.F. H.Q., Andover); 7, Plt. Off. G. R. A. Elsmie, scrum half (No. 43 Sqdn., Tangmere); 8, Plt. Off. W. V. M. McKechnie (R.A.F. Base, Calshot); 9, Flt. Lt. G. R. Beamish (Captain) (Home Aircraft Depot, Henlow); 10, Sjt. W. H. Kirby (R.A.F. H.Q., Halton); 11, Plt. Off. G. E. S. Williams (No. 2 F.T.S., Digby); 12, Flg. Off. H. A. Constantine (R.A.F. College), Cranwell); 13, Sjt. A. C. Hall (R.A.F. Station, Wittering); 14, AC. D. R. Gibbs (R.A.F. Station, Sealand); 15, Plt. Off. R. L. Wallace (No. 17 Sqdn., Upavon).

The R.A.F. Inter-Unit Challenge Cup.

The semi-final results of the R.A.F. Inter-Unit Rugby Cup Competition were as follows:—

R.A.F. Station, Sealand, defeated R.A.F. Station, Catterick, by 9 points to 7 points. The match was played at Grantham on Mar. 5.

R.A.F. Base, Gosport, defeated R.A.F. Station, Eastchurch, by 5 points to 3 points. The match was played at Uxbridge on Mar. 12.

The final tie between Sealand and Gosport will be played at Uxbridge on Wednesday, Mar. 26. Kick-off at 15.00 hours.

R.A.F. versus Civil Service:—The R.A.F. were beaten by the Civil Service at Halton on Mar. 12 by one goal and two tries (11 points) to one penalty goal and one try (6 points).

The next game is against the Army at Twickenham on Mar. 22 at 15.00 hours.

Association Football.

The first game in the Inter-Services Association Football Tournament was played at Wimbledon on Saturday, Mar. 15, and resulted in the Royal Air Force team taking both points from the Army.

Since 1920, when the two Services first met, eleven matches have been played and the Army have still a victory in hand. Judging by the form of the two teams on Saturday, the R.A.F. should have no difficulty in equalising the honours at the next meeting.

The R.A.F. thoroughly deserved their win. They were good in all departments and dominated the game throughout. The Army combined poorly as a team and were allowed very little individual scope by the Air Force defence.

Parrish put the R.A.F. ahead after twenty minutes and added another goal a little later. The Army replied with a goal by Henderson but before half-time Kelly found the net again and made the score a better indication of the run of the play.

During the second half rain fell continuously and made the game slow, the ball heavy and the ground treacherous, causing a number of minor injuries. The R.A.F.'s fourth goal came from a well-placed corner kick by Parrish which Vernon converted by sending both the goalkeeper and the ball into the net.

Pond after two rather painful collisions went out to the right wing and this was the signal for a very determined burst of Army pressure. Their left wing succeeded in scoring with what was probably the best shot of the match, but Christian in goal made no mistakes and proved himself a first rate keeper.

Both teams were at full throttle the whole time and played a very sporting game. Although the Soccer strength of the Navy has yet to be met, the R.A.F. appear to have a very good chance in the Tournament. With the R.A.F. halves and defence keeping up Saturday's form and the forwards attacking in a straight line they should go far in the Championship competition.

Result: Royal Air Force 4, Army 2.

The R.A.F. team were:—

L-AC. Chaston (Uxbridge); Cpl. Pond (Henlow), L-AC. James (Netheravon); Cpl. Baldwin (W. Drayton), Cpl. Robinson (Henlow), AC. Armstrong (Eastchurch); AC. Parrish (Kenley), AC. Kelly (Henlow), L-AC. Vernon (Halton), Sjt. Aquaroff (Worthydown), AC. Hickey (Uxbridge).—C. A. S.

Boxing.

The Royal Military College, Sandhurst, beat the R.A.F. College, Cranwell, at Sandhurst, on Mar. 7, by five events to four. The results were as follows:—

Bantam-Weight:—G/C. N. F. B. Shaw (Bedford and R.M.C.) beat F/C. E. Xydis (Cambridge University and Cranwell) on points.

Feather-Weight:—F/C. P. Q. Horner (Duncannon and Cranwell) beat S/C. R. C. H. Bellers (Bedford and R.M.C.) on points.

Light-Weight.—G/C. W. P. B. Arkwright (Eton and R.M.C.) beat F/C. C. D. Stephenson (Shrewsbury and Cranwell) on points.

Welter-Weight:—FIRST STRING.—G/C. P. A. Monro (Beaumont and R.M.C.) beat F/C. J. R. MacDonald (Ampleforth and Cranwell) on points. SECOND STRING.—G/C. R. F. L. Chance (Eton and R.M.C.) beat F/C. R. Monks (Electrical and Wireless School and Cranwell) on points.

Middle-Weight:—FIRST STRING.—F/C. T. N. Coslett (Barry and Cranwell) beat G/C. R. A. P. Macpherson (Epsom and R.M.C.) in the second round. SECOND STRING.—F/C. T. S. R. Bader (St. Edmund's, Oxford, and Cranwell) k.o. G/C. J. A. R. Robertson (Epsom and R.M.C.) in the first round.

Light-Heavy-Weight:—G/C. J. A. H. Powell (Eton and R.M.C.) beat F/C. M. W. L'l La V. Baker (Kelly College and Cranwell) on points.

Heavy-Weight:—F/C. T. B. Coote (Woking and Cranwell) beat G/C. T. R. S. Drought (Charterhouse and R.M.C.) in the second round.

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THE FLYING MAYOR OF TORONTO.

Major B. S. Wemp, D.F.C., late R.A.F., has been appointed Mayor of Toronto, the "Queen City" of Canada. This was recorded in *The Times* thus:—

Mr. Bert Wemp, a journalist and formerly a distinguished airman, has been elected Mayor of Toronto.

Major Wemp had a distinguished war career and took a prominent part in the air attacks on Zeebrugge. He retired from the R.A.F. in 1919 and returned to Canada.

For the past ten years he has taken a prominent part in civic politics in Toronto, and has been successively school trustee, alderman, controller, and finally mayor. By profession he is a journalist, and in his spare time he has taken an active part in the affairs of the Toronto Flying Club.

Soon after his appointment he was given a banquet which was presided over by Mr. Earl M. Hand, President of the Toronto Flying Club. In the course of the evening he was fêted and carried round the hall in a representation of an aeroplane bearing the inscription, "First Solo Flight—Zeebrugge to Toronto City Hall."

All this brings back a tragedy of the War 1914-18.—The last time one saw Bert Wemp he was the angriest man in France. It was on Nov. 3, 1918, the Sunday-week before the Armistice was signed. The Air Ministry had kindly invited one to make what in those days was called a Cook's Tour of the Front, and on that particular day one had gone for a drive with one of Major-General John Salmond's Staff from R.A.F. Advanced Headquarters by Velu Wood. We had lunched at Honnechy, at the Wing Headquarters of Lieut.-Colonel A. E. Cairnes, D.S.O. (commonly known as Tommy), now a Senator of the Irish Free State, and thence had driven up the Valenciennes road toward Bertry to visit some of our advanced aerodromes.

The enemy at that time had some long-range guns in the Forest of Mormal with which they were shelling the road by the map, as the sky was too unhealthy for their aircraft to spot for their artillery. The road ran along a ridge with a valley on the West side, and on the opposite side of this valley was an aerodrome on which was a squadron commanded by Major Wemp, who had his camp in the valley. There was a strong wind from the East and most of the shells were going over the road into the valley, which was fortunate because the road was just about as crowded as is Piccadilly in the height of the season, what with troops and transport going up for the big attack which was to start next morning, and incidentally end the War, and with empty transport coming back down the road

We turned down into the valley and at the bottom we were met by a corporal who directed us up to the aerodrome and warned us that the camp had been vacated because of shell-fire. When we got to the aerodrome we found Bert Wemp and his officers sitting on the edge of the plateau, as there did not happen to be any flying going on at the time, looking down at their camp and using the most horrible language because about ten minutes earlier a shell had dropped into their mess-tent and broken every bottle in the mess.—C. G. G.

IMPORTANT DATES.

Mar. 22.—Rugby Football, R.A.F. v. Army at Twickenham.
Mar. 25.—Annual General Meeting of the R.Ae.S.
Mar. 26.—Annual General Meeting of the Royal Aero Club.
Mar. 26.—Rugby, Inter-Unit Cup Final.
Mar. 27.—Inaugural Meeting of the British Gliding Association.
Mar. 28.—Boxing. I.S.B.A. Championships, Stadium Club.
Mar. 29.—Assoc. Football, R.A.F. v. R.N. and R.M. at Milwall.
April 3.—M. M. P. Grimault's lecture before the Royal Aeronautical Society.
April 5.—N.F.S. Meeting at Reading.
April 6.—The third Ashwell-Cooke Challenge Competition at Lympne.
April 12.—N.F.S. Meeting at Hull.
April 19.—Leicester Flying Meeting (Leicestershire Aero Club).
April 21, Easter Monday.—Meeting at Hanworth.
April 26.—N.F.S. Meeting at Leeds.
May 31.—Bristol Air Pageant (Bristol and Wessex Aeroplane Club). Official opening of Bristol Municipal Aerodrome.
June 7.—N.F.S. Meeting at Reading.
June 9.—Northamptonshire Aero Club's Meeting at Sywell.
June 10—15.—F.A.I. Conference, Paris.
June 14.—R.A.F. Garden Party at Manston.
June 15.—N.F.S. Meeting at Nottingham.
June 21.—Annual Air Rallye at Haldon Aerodrome.
June 21.—Competition for the Gwynn Maddocks Cup at Heston.
June 26.—Ipswich Air Pageant (Suffolk and Eastern Counties Aeroplane Club). Official opening of Ipswich Municipal Aerodrome.
June 27.—Annual Dinner, R.A.F. Dinner Club.
June 28.—Royal Air Force Display at Hendon.
July 5.—King's Cup Air Race (Royal Aero Club—Heston Air Park).
July 13.—N.F.S. Meeting at Leeds.
July 19.—N.F.S. Meeting at Hull.
July 20—Aug. 7.—International Touring Competition.
July 26.—Norwich Flying Meeting (Norfolk and Norwich Aero Club).
Sept. 1—6.—International Congress on Air Navigation at The Hague.
Sept. 6—28.—International Aero Exhibition at Stockholm.
Sept. 20.—Liverpool Air Pageant (Liverpool and District Aero Club and Lancashire Aero Club).
Sept. 27.—Air Pageant at Hanworth.
Nov. 28—Dec. 14.—International Aero Exhibition at Paris.

THE AIRSHIPS R.100 AND R.101

In the House of Commons on Mar. 12, in reply to Mr. D. G. Somerville, the Under-Secretary of State for Air said that no arrangements for commercial flights by R.100 had yet been considered, but he expected that she would make an experimental flight to Canada towards the end of May.

In reply to further questions Mr. Montague said that he would consider giving members of Parliament an opportunity of taking part in this flight. He hoped that it would be possible to arrange for a flight or flights but both airships would be in their sheds for a little time to come and it was inadvisable to make any arrangements for the present.

Mr. Mander suggested that many Members of the House would not be likely to vote any more money for airships until they had been taken for a successful flight.

[Mr. Mander's idea is one which might be usefully extended. Members should demand rides in Tanks or Submarines before voting any more money for the other Services. Some of them might also sample the education in the Elementary Schools before voting any more money for so-called education. This last would serve two purposes. And as for the laws regarding licensed premises, practical experience of being turned-out in the middle of a modest half-pint should go far to amend the law.—C. M. MCA.]

HOW THINGS ARE IN THE STATES.

This, from an old-timer in aeronautical affairs, will be found of surpassing interest:—

We are in a hell of a mess at present, broadly speaking. The bigger fellows are sitting tight, waiting for the market to open up again, and cutting expenses to the bone meanwhile. The smaller factories and operators are going bust by the dozen.

Commercial sales to the ultimate buyer have been negligible for months past, although a few distributors and dealers are pretty well stocked up from the factories. The price-war has started, being led by Stinson and Cord, with their Stinson Junior at $5,775,—a job which is selling, or rather *not* selling, at from $7,500 up in other lines. The majority of plants are on half time, except those with Government contracts, which have saved the fortunate ones.

The St. Louis Show was terribly depressing,—everyone with a face full of worry and a heart full of woe. I spent a morning at the Wright plant a few days ago and it was like a morgue compared to 1928. The new Curtiss plant at Buffalo has not yet been operated at all,—$1,250,000 idle!!

The stock crash just bust everything wide open, and aviation suffered worst, being a new luxury. The Summer should help a little, but we shall be lucky if we sell 4,500 new airplanes this year—compared to 6,304 in 1929.

Too much surplus equipment lying around now, although there will be plenty of people flying on the transport lines this year and more mail carried than ever before. And there's a lot of water to be pumped out of aero stocks bought at fantastic prices.

The only people sitting pretty are the bankers,—of course. They got a good slice of cash from the original issues, and a number of them sold short before the crash, as it was inevitably coming along before October. The public are now left holding the bag, as usual.

United Aircraft and Transport are about the strongest group financially now,—they are making money and are secure with Government orders for their factories and mail contracts on their transport lines. So they don't do much worrying. Aviation Corp. are in rather a tangle of re-organisation which leaves 'em very much in the air at present. Curtiss-Wright are determined to hammer through and will probably come out all right in the end.

Detroit Aircraft Corp. are selling a few Lockheeds and Ryans—the latter in the export field—and have enough money to weather the storm. It's tough sledding for the rest.

Exports generally have improved and are full of promise for the future. Curtiss are sending a plane and crew over to Europe this Summer to see what they can sell, having done very well in S. America with the same system. Don't know how it will work out in Europe, though.

[In this connection one hears that Lt. Doolittle, late U.S. Army, who won the Schneider Trophy in 1925, is to do a tour of Europe with an outfit of Curtiss Hawks, and with Major Melvin Hall as manager.—C. G. G.]

Hope that our factories in England are alive to the importance of keeping awake on that subject.

Fokker is now General Motors of course, and is making a bid for time-payment sales of airplanes through the G.M.A.C. the automobile hire-purchase company. That may work if the insurance problems can be met.

THE PICTURE ON THE FRONT.

The picture on the front this week shows the famous Organ Mountain near Therezopolis, Brazil, about 50 kilometres north of Rio de Janeiro. The photograph was taken by Capt. Sydney H. Holland, Rua Capitao Salomon 30, Rio de Janeiro.

Captain Holland first became famous as an aerial photographer by doing a complete photographic map of Buenos Aires entirely by himself,—acting at the same time as pilot, photographer, chief engineer and map maker. He is now doing photographic work, running an air transport service, doing some instruction, and giving occasional demonstrations of aerobatics in the air, working all over Brazil with Rio as his base.

In the middle of the picture may be seen a curious rock with a face on it, known as the Old Man. Local Indian legends say that there is treasure hidden inside it. The peak of the Organ Mountain is about 6,000 feet high.

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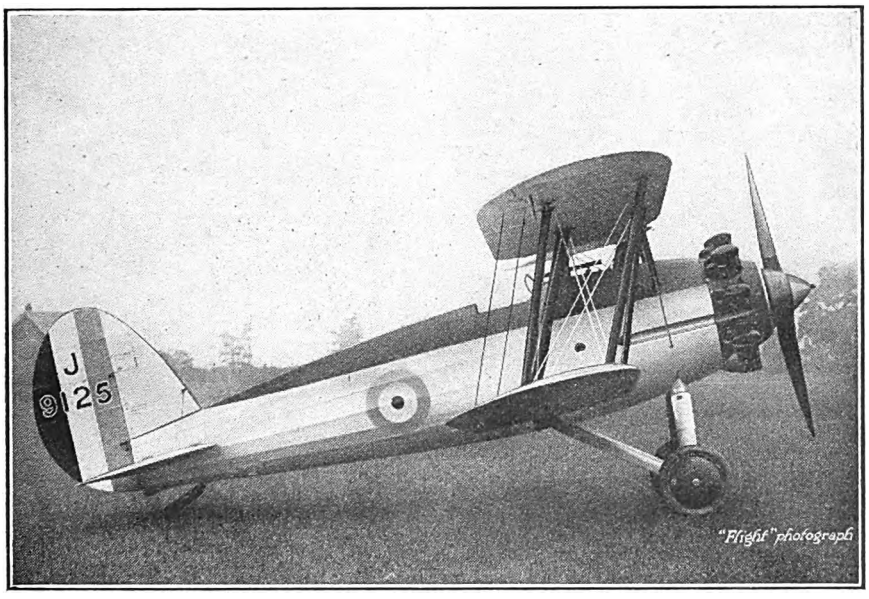
GLOSTER

The Pioneers of Steel Aircraft and Variable Pitch Propellers.



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For performance, fighting view and manœuvrability, it is impossible to find a machine to equal the Gloster All-Metal Single-Seater Fighter. Its construction has been described as an engineering triumph. Ease of maintenance in the field, and interchangeability of parts are other special features.

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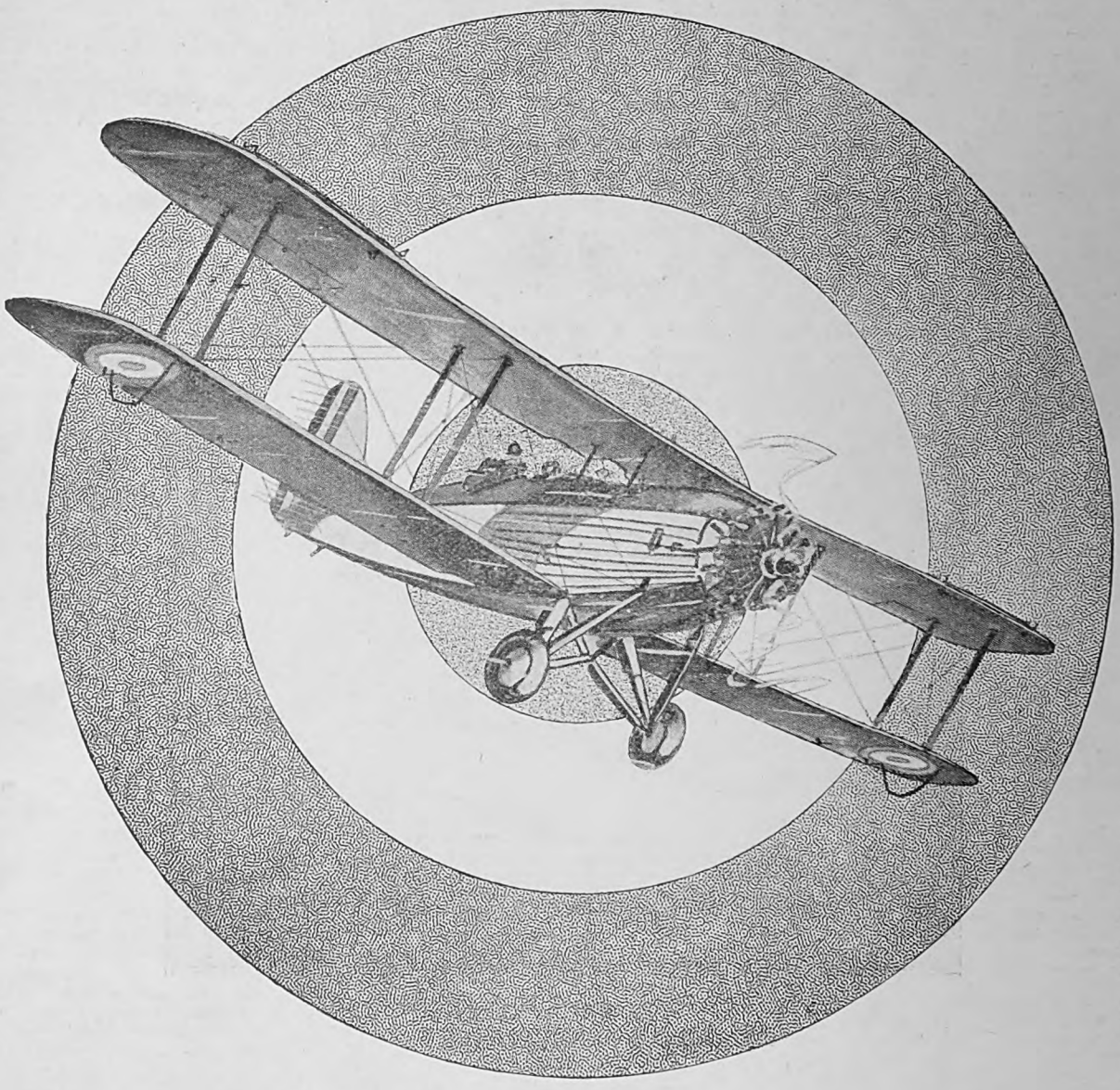
THE WESTLAND WAPITI



THE standard General Purpose two-seater used by the Royal Air Force, R.A.A.F. and S.A.A.F. For wireless, reconnaissance, bombing, photography, desert patrol, and advanced training. Fitted with Jupiter VIII or Jaguar Engine, slots, and straight or split-axle land undercarriage, floats or skis. All-metal or composite wood and metal construction.

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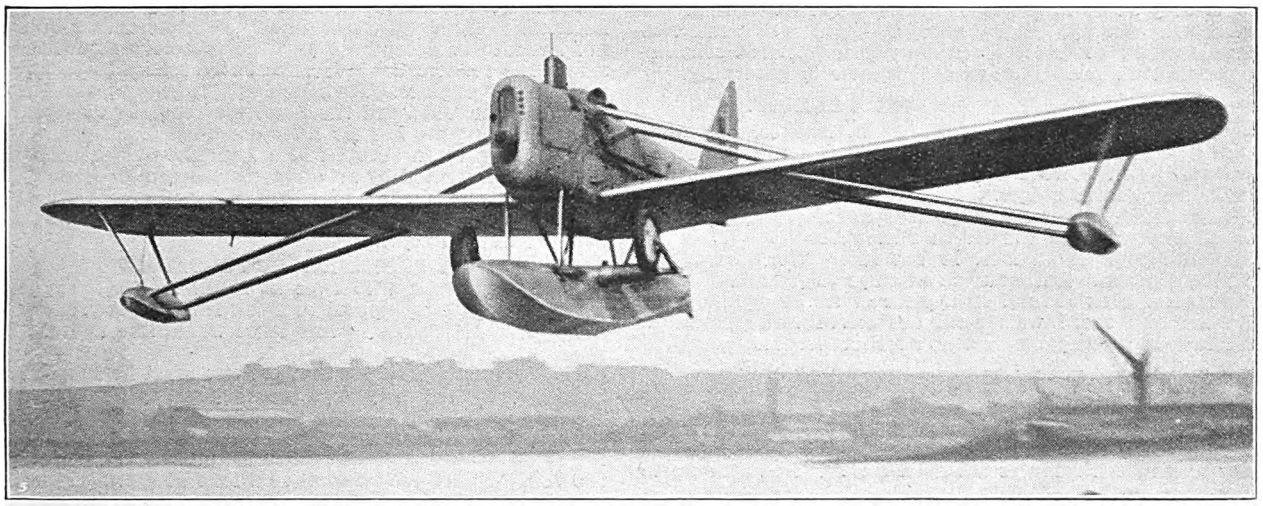
THE LIGHT AEROPLANE
AND THE FLYING CLUBS.



A NEW AMPHIBIAN.—The Short Mussel two-seat light amphibian (Cirrus III engine).

THINGS ARE NOT WHAT THEY SEEM.

This comes all the way from Mexico:—

Some little while ago there appeared a story in THE AEROPLANE describing at great length the adventures of two British pilots who made a special trip to sunny Spain to ascertain just what the word Moth means in Spanish.

After reaching Spanish territory a landing was made for fuel near a small village and adjacent to the local Plaza de Toros, or Bull Ring. As neither pilot could speak a word of Spanish, a search of the village was made for a Spanish-English dictionary. Diligent search uncovered the desired dictionary, and with it, and the collaboration of the village mayor, town council, church dignitaries, the local bull-fight champion and populance *en masse*, the object of the flight to Spain was unfolded.

Immediately following an adjournment for lunch was made, and an impromptu bull fight in honour of the distinguished visitors was staged in the local bull ring whence, among hearty vivas, the visitors were taken to lunch.

After lunch another session was declared opened and everyone got down to business. After several hours' hair-pulling and gesticulating it was resolved that the equivalent of the word Moth in Spanish was Mariposa. After this discovery the air was rent with storms of *vivas*, the visitors made way to their Gipsy-Moth, and after filling up their fuel tanks, the return trip to London was made, where their report to the effect that Moth means Mariposa was duly gazetted at Stag Lane.

[This is not quite accurate, but it is near enough.—ED.]

We are now in receipt of a sensational report from our special correspondent at the City of Mexico, Señor Pom Posa de Chile con Carne, who informs us that the report furnished by the two pilots as mentioned is entirely inaccurate, and that Moth does not mean Mariposa at all!

The word Moth in Spanish is Polilla, which is a horse, or rather a moth, of an entirely different colour. Mariposa means Butterfly. Moth means Polilla.

Following this bombshell, we expect further expeditions to Spain to investigate this matter will be made in the very near future.

THE CIRRUS III AT ST. MORITZ.

Lieut. C. R. V. Pugh, R.N., recently bought a D.H. Moth (Cirrus III engine) G-EBQW from National Flying Services Ltd. After he had flown the machine for a quarter of an hour he took off, with another Naval Officer, Lieut. J. B. Buckley, as/and luggage, and flew to Le Bourget, thence to Basle, and thence to St. Moritz.

They landed, as is done, on the frozen lake there, in the snow. Lieut. Pugh says, in a letter to Cirrus Aero-Engines Ltd.—

I think I may claim a record for a Moth with a Cirrus Mark III in getting to St. Moritz and off again in the snow at an altitude of 6,200 feet, with two up and luggage. I am quite delighted with the little engine, which ran splendidly at all altitudes, and started up with ease after ten days in 17 deg. of frost.

COMPER AIRCRAFT IN THE SOUTH.

Brian Lewis and C. D. Barnard Ltd., 30, Conduit Street, W.1, have been appointed sole concessionnaires in England south of a line from Gloucester to Ipswich, and excluding Wales, for all products of the Comper Aircraft Company Ltd., of Hooton.

Brian Lewis and C. D. Barnard Ltd., has been formed to continue the aircraft sales side of Malcolm Campbell Ltd. This new firm will deal in aircraft only and are also agents for the D.H. Moth series.

Besides selling machines, they will teach flying, organise special flights, and work out routes for the private owner. They have show-rooms at Heston where there will be a ground engineer and salesman and where demonstration flights can be made.

The Comper Swift, which was fully described in THE AEROPLANE for Jan. 15, 1930, sells for £400 in the Standard 1930 Model, and £450 for the Swift de Luxe.

A NEW AMPHIBIAN.—The Short Mussel two-seat all-metal light monoplane (Cirrus III engine) now fitted with the Short amphibian gear. The gear is similar to that which was used on Mr. Scott-Taggart's Gipsy-Moth, which was seen at several of the flying meetings last year.

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THE INDIAN FLIGHT TOWARDS CROYDON.

On Mar. 3, as reported in THE AEROPLANE for Mar. 12, Mr. R. N. Chawla and an engineer left Karachi in a Moth in an attempt to reach Croydon. They reached Halfar aerodrome on Mar. 12 and Marignane, Marseilles, on Mar. 17.

This is really quite a good show. Even if they got no further they would have shown that at any rate there is one Indian who can fly. A few more Chawlas and a few less Ghandis would be better for India and go towards convincing people that some Indians are capable of governing.

THE TRIALS OF AN AIR TOURIST.

Towards the end of 1929 Mr. Gosta Andree, the well-known Swedish aviator, flew from Stockholm to Cape Town in a D.H. Moth (Cirrus engine). He covered the distance of 9,320 miles in 26 stages.

On his return flight he progressed satisfactorily until he reached Benghazi, on the North African coast.

He left Benghazi on Dec. 13 but soon after leaving he ran into a storm. Rather than attempt to plough through it, he turned back to land on a piece of sandy ground near Benghazi and there wait until the storm had passed.

Instead of getting better the weather became gradually worse and in the middle of the night a gale blew up with the result that he had to hang onto the wings of his Moth all night to prevent it from being blown away.

The next day the sea broke over the edge of the sand dunes, a thing that had not occurred once on a hundred years, and in ten minutes his machine was in water up to its lower planes.

He then had to walk for three days in the desert without food and it was not until fifteen days later that he was able to salve his machine from the water.

The only damage to the Cirrus engine was damp in the magneto armatures, but as a precaution he has fitted a new airscrew. Mr. Andree will shortly resume his flight.

A WARNING TO TRAVELLERS IN ITALY.

The Air Ministry in General Notice No. 7 of 1930 state that representations have been made by the Italian Government that certain British civil pilots, when flying in Italy, have failed to observe the Italian regulations concerning prohibited areas, and altitude of flight over inhabited areas.

Attention is drawn to Air Ministry Notice to Airmen No. 8 of this year which describes and specifies the following prohibited areas in Italy: The Vatican City, the Viareggo Artillery Range, and the Furbara Air Gunnery and Bombing Range.

Details of the areas in Italy over which flying is prohibited were published in the Monthly Supplements Nos. 52, 54 and 55 to *The Air Pilot* (1924 Edition). Particulars of the areas can also be obtained from the undermentioned sources:—The Automobile Association, Fanum House, New Coventry Street, W.1; National Flying Services Ltd., Grand Buildings, Trafalgar Square, W.C.2; and from The Royal Aero Club of the United Kingdom, 3, Clifford Street, W.1.

The Italian regulations concerning altitude of flight over inhabited areas are that flight over any inhabited area or any gathering of people at such a low altitude as would make it impossible to alight outside the area or gathering in gliding flight, is prohibited.

A still better arrangement is not to fly over Italy at all.

SOME CLUB FIGURES.

The following analysis of the figures for Club Flying in 1929, published recently in THE AEROPLANE, has been worked out by Major Kenneth Beaumont, D.S.O., of the London Club. They give an interesting basis for the discussion of the comparative skill and efficiency of the instructors and ground-staff of the Clubs, and of the ability and keenness of the members:—

Club.	Number of Aircraft.	Average Hours per Aircraft.	Number of Members.	Average Hours per Member.
London Aeroplane Club	6	439	228	11½
Lancashire Aero Club	—	—	76	16
Midland Aeroplane Club	4	350	66	21
Yorkshire Aeroplane Club	3	375	59	19
Newcastle Aero Club	3	415	188	7
Hampshire Aero Club	4	419	119	14
Norfolk and Norwich Aero Club ..	3	317	39	24
Bristol and Wessex Aero Club ..	3	347	142	7
Cinque Ports Flying Club	2	433	53	16
Scottish Flying Club	6	185	40	28
Liverpool and District Aero Club ..	4	357	57	25
Southern Aero Club	1	950	25	38
Northamptonshire Aero Club ..	2	250	43	12
Household Brigade Flying Club ..	1	184	34	5

Figures taken from table on page 402 of THE AEROPLANE of Mar. 5, 1930.

Only Clubs included which have operated a whole year.

"Members" include pupils and "A" and "B" Licence pilots.

"THE SYWELL WINDSTOCKING."

The Northamptonshire Aero Club are to be congratulated on the first number of their journal, *The Sywell Windstocking*, which is to be published on the fifth of each month. Mr. Newton, the energetic chairman of the Club, is the Honorary Editor.

Mr. S. P. Tyzack contributes an amusing account of how he came to fly a "giant air-liner" at Rotterdam. One does not hesitate to accept the yarn as veracious in outline but surely his readers are not sufficiently voracious to swallow "1,000 h.p." engines. These are not in general use. Napiers produced the Cub, and the Schneider engines this year exceeded this figure, but air lines don't use them yet.

There is also an account of a Landing Competition for a silver cup presented by an anonymous feminine donor. This seems somewhat akin to the Ashwell Cooke Cup of the Cinque Ports Aero Club, but apparently this cup was flown for and won outright.

A SPORTING SUGGESTION.

A young woman who lives in Essex makes a suggestion which may possibly appeal to a few hundred readers of THE AEROPLANE. If so, we in this office would like to hear from them.

The suggestion briefly is that as there must be thousands of people in this country who are desperately keen on flying but cannot afford the fee for tuition somebody ought to get up some kind of competition in which for an entrance fee of 5s. or 10s. the winner would, as she says, "scoop all the accumulated cash and have a stab at getting his or her ticket."

The sender of the suggestion says that the snag is that the winner might possibly be one of those people who find after one or two lessons that they never will be able to fly, and such a result would be rather annoying to the rest of the competitors. This difficulty could probably be got over quite well by testing out the first two or three in the competition on a Reid Aptitude Indicator, on the distinct understanding that anybody who produced a chart below the standard approved by Sq. Ldr. Reid would not be considered the winner of the competition.

Subject to that condition, one is inclined to think that the best form of competition would simply be a raffle. The prize money, naturally, would not be handed over to the winner but would be deposited with the particular flying school at which the winner wished to be trained, and if the winner qualified for his or her ticket in less time than that covered by the amount of money, then the balance might be taken as a prize in kind.—C. G. G.

BENDIX WHEEL BRAKES.

The following tests with multi-engined aircraft fitted with Bendix wheel brakes are interesting.

The Curtiss Condor twin-engined biplane (two 600 h.p. Curtiss Conqueror engines) has a total all-up weight of 17,000 lb. and is fitted with 54 × 12 in. tyres and 20 in. Bendix brakes. These brakes held the machine with both engines running at full throttle. In landing the brakes showed a deceleration of 8 ft. per second, or, in other words, the Condor required a run of only 110 yards to stop after landing at 50 m.p.h.

In the case of the Westland Four (three Cirrus-Hermes engines) which has 12 in. Bendix wheel-brakes, it was found that it was possible to run the two outboard engines at full throttle with the brakes holding the machine comfortably. With pilot and three passengers the machine on landing ran 215 yards without brakes. With the brakes applied the run was reduced to 118 yards, a reduction of nearly 50 per cent. when using Bendix brakes.

At the time of writing this particular machine had completed 30 hrs. flying and had made 60 landings during which the brakes were used. During this period no adjustments whatsoever were made to the brake installation.

AT LAST.

The Stockholm correspondent of *The Times* reports that the 23rd session of the International Air Traffic Association was opened on Mar. 14. At the final sitting on Mar. 15 Captain Carl Florman, Managing Director of the Swedish Aero-Transport Company, read a paper on air-mail flying at night.

A resolution was passed asking him to work out a detailed scheme of night air-mail transport for presentation to the Association. The delegates expressed their belief that the night transport of mails was becoming increasingly necessary, and that international air mails might have to be confined very soon to night air-lines. The chief obstacle to such services was the lack of night-flying illumination and the insufficiency of aerodromes.

This is to be welcomed as a sign that the air mail companies realise the advantages of postal services and realise too that such services to be of any practical use must operate at night.—a gospel preached with fervour by THE AEROPLANE.

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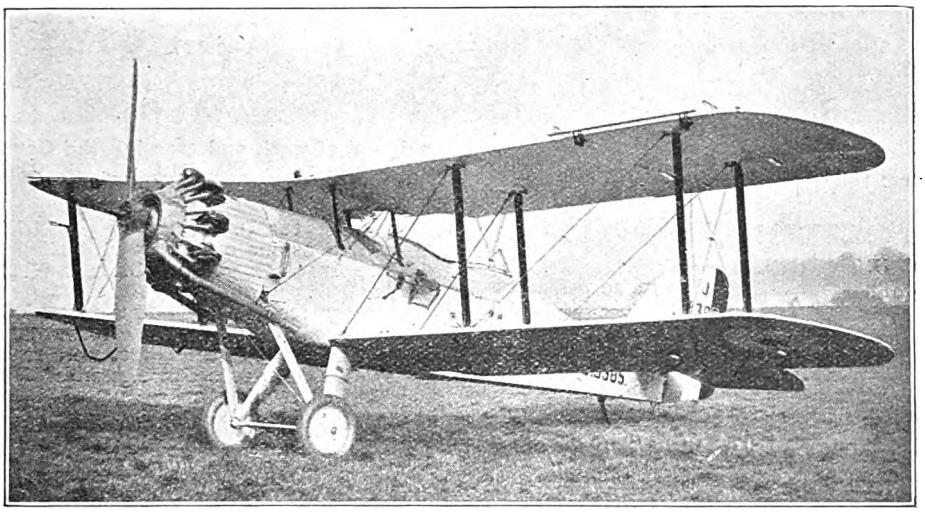
AND

THE WESTLAND "WAPITI"



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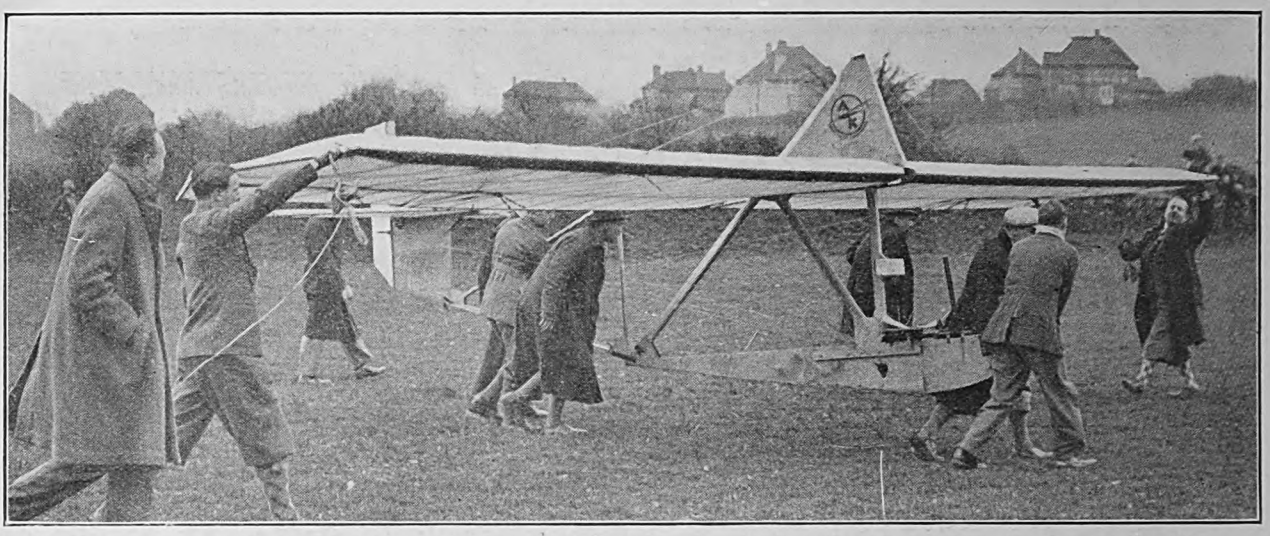


MAN-POWER.—The London Gliding Club Committee doing a spot of work and carrying the German Zogling to the start. Left to right: Messrs. Blyth, Culver, G. O. Manton, Howard Flanders, M. D. Manton, C. L. Startup, and Ashwell-Cooke.

GLIDING.

THE LONDON GLIDING CLUB.

On March 16 the London Gliding Club made some prolonged trials of their two primary-training-type gliders. One of these was imported from Germany and is the property of the British Gliding Association and the other has been built by the R.F.D. Co., of Guildford. Both gliders are the gift of Mr. Dagnall of the R.F.D. Co.

The British-built glider was based on designs of the National Glider Association of America, which that association very generously sent to The Aeroplane in reply to a letter asking for information. The Aeroplane handed over these plans to the B.G.A. so that plans of a proved type of glider might be available for those who wished to use them. There is interest in noting that this Dagnall-built glider was the more popular.

As a matter of fact trials were to have been conducted far from the madding crowd and ubiquitous press-photographer. For this reason no advertisement had been made by the London Gliding Club, who were therefore very staggered when notices appeared in various London newspapers on Saturday (March 15) stating that a display of gliding would be given by Captain Barnard on Sunday at Stoke Park Farm, London Road, Guildford.

This notice was given without the authority of the Club, of which Captain Barnard is not even a member. Further surprises were in stores for the Club when they got to the field, for various press-representatives and photographers turned up with passes. As no Captain Barnard appeared perhaps the proceedings were an elaborate practical joke.

Fortunately, if one may judge from the reports which appeared, the Club were able to explain the whole situation satisfactorily. People were made to understand that the whole proceedings were merely a trial of the gliders, and that no publicity had been sought, and that no real gliding or soaring was to be attempted.

The first glider launched was the Dagnall-built machine with Mr. Marcus D. Manton as pilot. Mr. Manton will be remembered as one of the pre-War pilots at Hendon and as the Chief Instructor at the Graham-White School throughout the War.

About five men on each rope formed the first launching party. These numbers were afterwards increased to about nine when heights of thirty feet were reached and distances of 200 yards were covered. The wind was probably from 15 m.p.h. to 25 m.p.h.

Then Mr. C. L. Startup, of The Aeroplane Advertising Staff, and a war-time pilot, made two successful flights. After this a number of pilots followed each other, Mr. Douglas Culver, the originator of the Gliding Lunch, Mr. G. O. Manton, Colonel The Master of Sempill, Mr. E. C. Gordon England, Mr. Melville, Mr. Ashwell-Cooke, Mr. Latimer Needham, Mr. Lowe Wylde, Flt. Lt. le Poer Trench, Flt. Lt. R. L. R. Atcherley, Mr. C. Clarkson and some more.

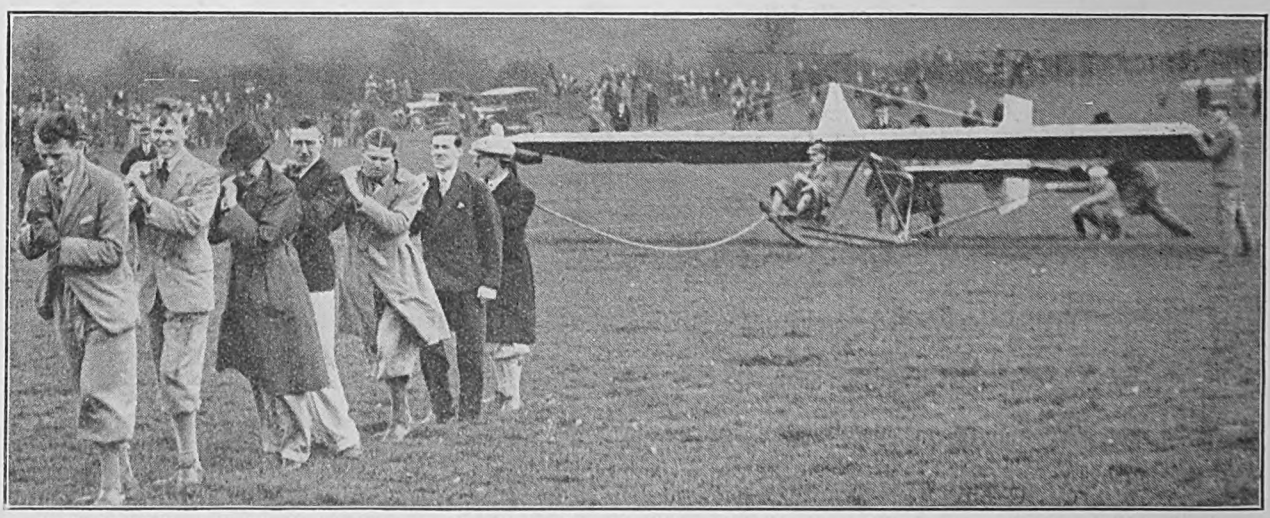
One has given this imposing list of names to show that the gliders were thoroughly tried out. The Club should profit considerably from the various comments and criticisms, caustic and otherwise, made by these people.

The whole afternoon was great fun, and, apart from the contretemps at the start, everybody enjoyed themselves as they did the tea provided by Mr. Dagnall at the excellent Caxton Hotel in the London Road.

The nameless, numerous and heroic crew who hauled so tirelessly on the ropes must also be commemorated, as must also the various members of the R.F.D. Company who worked so hard on the machines.

One has three outstanding memories of this notable occasion, the check cap of Mr. Marcus Manton, the terrific altitude reached by Mr. Lowe Wylde of the Kent Club on the German glider when all the crowd said "Oooh-er" as they do when a rocket goes up—and the check overcoat of Flt. Lt. Atcherley.

The humour of the situation is that Mr. Manton, who



THE START.—Mr. M. D. Manton on the Dagnall-built glider with the launching crew walking-out the shock-cord which is used as a catapult.

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taught many distinguished officers of the R.A.F. to fly at Hendon, attained, for the first time in his life, World-wide publicity in the Press, as the first pilot of these gliders, that Mr. Gordon England, whose name is known all over the World for his motor-car bodies, and who was gliding in 1908, and broke his leg gliding at Itford in 1922, after test-flying aeroplanes all through the War 1914-18, was passed over unnoticed by the Press, and that no Press-man connected Flt. Lieut. Atcherley with the Schneider Trophy Team. Such is the intelligence of our newspapers, who were only interested in the gliding game because the name of Mr. C. D. Barnard is still on the "heart-interest" list in the editorial offices of Fleet Street.

THE B.G.A. JOURNAL.

The first number of the Journal of the British Gliding Association has appeared and may be had from the offices of the Association at 44a, Dover Street, W.1., for 2s. 6d.

By kind permission of the Royal Aeronautical Society, the journal contains a reprint of the lectures given by Dr. Georgii and Herr Stamer, before the Royal Aeronautical Society. People who want an account of the discussion which took place after the lectures and during the informal dinner should refer to The Aeroplane for Feb. 26.

The Secretary in his notes very rightly emphasises the very high load factors found necessary by the Germans. A sand loading test of 6 with the C.P. in the forward position is imposed for privately-built gliders in Germany.

Under the heading of Club Reports only the activities of the London Club are chronicled, but both the name of the club and one of its committee are omitted. What has happened to the other nine or ten clubs? The Midland Club have already launched their glider.

These are the only possible criticisms that one can make, and when one considers the terrific pressure of work with which its editor, the Secretary of the B.G.A., Mr. Howard Flanders, is coping, one wonders that there are not more. Gliding enthusiasts and people generally interested would do well to spend the odd half-crown on the first number of the Journal.

A BRITISH AGENCY FOR KEGELS.

S. T. Lea, of 141, Bond Street, W.1, have informed The Aeroplane that they have been appointed sole concessionaires for Great Britain and Ireland for the Kegel sailplanes and gliders. They expect one machine of the three main types within a month, these types are the Zogling or primary-training type, the Prufling or intermediate type, and the Professor, which is a full-fledged sailplane.

S. T. Lea will have their catalogue, with prices for these machines, ready in a fortnight. They are to be congratulated on their enterprise in securing this agency, as there is little doubt that some time will elapse before sailplanes of performance equivalent to that of the German machines can be built in this country. Two Zogling-type machines have already been built over here.

THE MIDLAND GLIDING CLUB

The Midland Gliding Club has been formed with headquarters at 17, Victoria Street, Wolverhampton. The founders are Mr. J. V. Rushton, who is the Honorary Secretary, and Mr. C. V. Kerpen, who is Honorary Treasurer. The Chairman is Mr. C. Fenwick. The club has a glider which was built by Mr. Rushton and was launched on March 2. Shock-cord and motor-cars were used.

One would like to point out that motor-car launching has resulted in a number of deaths of glider-pilots in America, and is not to be recommended. Nine to twelve men on a long enough shock-cord will launch a glider from level ground quite successfully.

Anyway one is glad to hear that Wolverhampton has got a club going. There are now enough number of clubs to warrant an inter-club competition this Summer.

THE HARROGATE AIRCRAFT CLUB.

At the last meeting of the Aircraft Club, Harrogate, Mr. R. F. L. Gosling read a paper on Practical Gliding which dealt with the subject very completely, from the choice of a site to the use of the controls. The lecture was illustrated with diagrams.

Mr. E. T. W. Addyman, the Honorary Secretary of the Club thanked Mr. Gosling and said that a number of members present had many years ago formed a flying club in Harrogate which had ultimately developed into the Yorkshire Aero Club. They had, however, found the expense was too great and that they did not always get a turn. They therefore decided to wait until there was an aerodrome nearer Harrogate. He drew attention to the work which had already been done on the glider which the Gliding Section of the Club are building.—F. E. L. P.

THE WINCHESTER GLIDING CLUB.

A Gliding Club has been formed in Winchester and is fortunate in having as one of its members a farmer who has the old Chattis Hill Aerodrome on his property. Presumably the idea would be to use this for preliminary training. The hills to the east of Winchester will provide, one imagines, the gliding ground. There is a good hill, though private property, known as Old Winchester Hill, near Droxford.

THE GEELONG GLIDING CLUB.

Frequent references to the activities of the Geelong Gliding Club, of Australia, have appeared in The Aeroplane. The Club is busily engaged in training a number of *ab initio* glider pilots.

The members are very anxious to get in touch with some of the German Clubs and organisations. Perhaps therefore some of our German friends who read The Aeroplane will write to the Geelong Gliding Club, Box 151, Geelong, Victoria, Australia.

Our good friend Herr Oskar Ursinus, editor of *Flugsport*, may even see fit to put this paragraph in his paper, which is the organ of all "Segelfliegers."

A POWER-DRIVEN GLIDER.

The Rhön-Rossitten-Gesellschaft, who are the famous German gliding association, have made a series of experiments with a form of tailless glider. Unlike the pterodactyl of Captain Hill this German type has cantilever fins and rudders at the wing tips. The type has been successfully developed and in its latest form was demonstrated at the Tempelhof aerodrome in Berlin recently. The Storch V (Stork), as the latest example is named, is a single-seat machine with a two-cylinder D.K.W. engine of 7-9 h.p.

The Storch V has no undercarriage and is catapulted off the ground like a glider.

Dimensions.—Span 12.37 m. (40 ft. 7 in.), Length 3.80 m (12 ft. 6 in.), Height 2.00 m. (6 ft. 7 in.), Wing area 18.5 sq. m. (199 sq. ft.).

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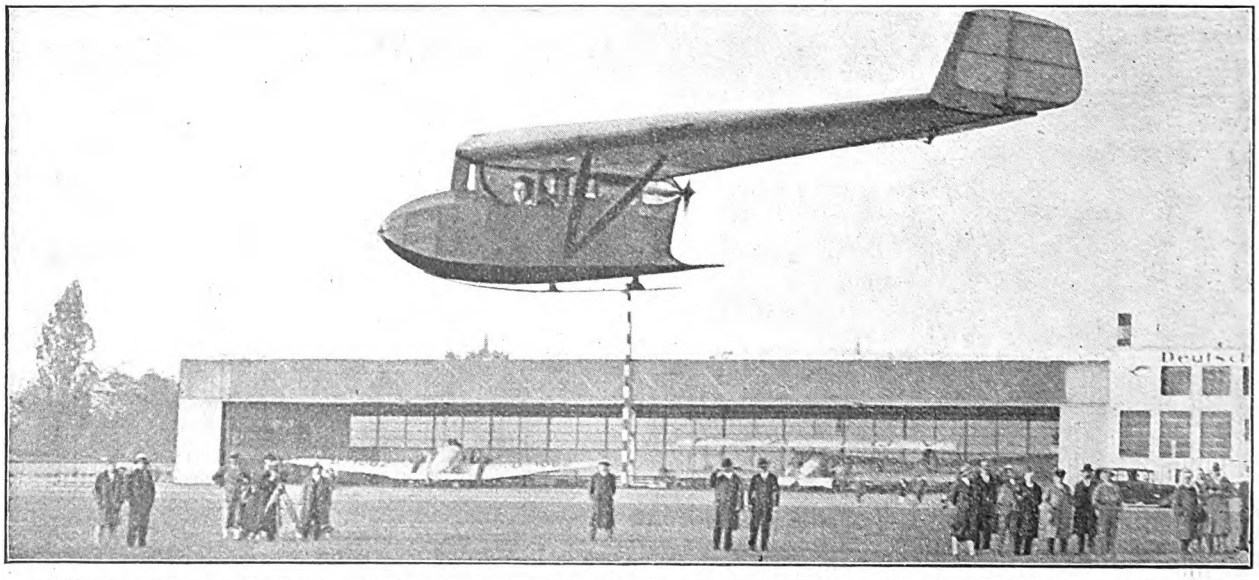
Performance.—Max. speed 150 km./hr. (93 m.p.h.).



FULL-SCALE RESEARCH.—The tail-less aeroplane which was produced by the Rhön-Rossitten A.G. after model and full-scale glider tests.

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COMMERCIAL AERONAUTICS.

COMMERCIAL AIR TRANSPORT IN GERMANY.

The lecture given by Major Martin Wronsky, General Manager of the Luft Hansa A.G., on March 10 before a joint meeting of the Royal Aeronautical Society and the Institue of Transport drove home some valuable lessons.

Major Wronsky definitely stated that Luft Hansa carried fewer passengers in 1929, and that the Germans are going to concentrate on high-speed long-distance mail-carriers.

This, as THE AEROPLANE has argued for years, is the most promising way of making air transport self-supporting. Mails must be flown at night, for as Mr. Handley Page said in the discussion, letters to be of any value must be posted one night and reach their destination the following morning.

We must have faster and more frequent services as Sir Sefton Brancker said. Obviously air transport is going to progress, not by carrying more people at one time or for a given power than the older forms of transport, but by carrying people faster and therefore further in a given time. Machines can therefore be kept comparatively small, but services must be flown more frequently and much faster.

Then if we use smaller machines and buy them ex stock, we shall, as Mr. Walker pointed out, get them for less money in the first place and so get nearer to that ideal state when civil aviation will fly by itself.

One would rather like to see some of our fast-flying day-bombers, and high-performance machines of similar types, completely gutted of all war-like gear and protuberant accessories and turned into freight machines. These craft would then fly at their really surprising speeds during the night to deliver mails to the European capitals.

The objection to this by the Government and Imperial Airways will be that they could not afford to fly single-engined aircraft over thickly populated areas at night.

One would have thought that the aircraft-operating firms would have discovered that with their own excellent maintenance, the chance of a forced landing because of engine failure is .000? per cent. These night-flying machines could be made to fly at sufficient height to ensure adequate gliding range in case of engine-failure and would of course be furnished with flares. And the route would have adequate emergency grounds and lighting.

Imperial Airways, at the moment, have by their contract to use, even for freight and postal services, multi-engined machines which can be used for passenger transport. Thus the nearest to a system of mail-carrying as outlined above would be the carrying of mail over certain portions of their route by night. This would speed up the mail service considerably.

THE LECTURE.

At the opening of his paper, Major Wronsky explained how the War 1914-18 affected German aviation. Germany lost her colonies, and all military flying was forbidden. The lack of military aviation meant a lack of experimental types, experience with which would have given considerable help to the development of civil types. The lack of colonies meant that there was little inducement to develop air-routes outside the country.

Germany started to develop air transport about the same time as England, that is about the Spring of 1919, when small transport companies backed by the banks, larger shipping firms and still remaining aircraft industry, were formed. Several short routes were opened, which were about the distance from London to Manchester and London to Edinburgh. Major Wronsky said that the success of routes over such restricted areas could not be a success. He reminded the Meeting that a similar state of affairs existed in England in the early days of railways when a large number of small companies tried to introduce the newest form of transport into a limited area between the years 1840 and 1870.

In the Spring of 1923 two large concerns were formed in German aviation which, though united in actual organisation, for three years worked in competition. They did, however, a valuable amount of pioneer work both inside and outside Germany.

In 1926 an agreement was made between these two companies and the German Luft Hansa A.G. was formed. This concern is commissioned by the State to develop civil aviation.

Such Government recognition consolidates the position of the Luft Hansa though without conferring a monopoly. Any concern, although without State Subsidy, can enter German aviation. Luft Hansa is a limited company with the German Empire, the German States and Towns, and all the leading industrial, banking and traffic concerns as shareholders.

EXTREMES.—The Junkers G.38 four-engined monoplane and a Junkers Junior two-seat light monoplane. The G.38 has its engines and part of its passenger accommodation in the wing.

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Major Wronsky stated that last Summer Luft Hansa had service stations in over 100 large Towns, of which about one-sixth were outside Germany.

An unique feature of Germany's aviation system are the regional companies which, until the formation of Luft Hansa, used to operate the various internal routes. Now they are organised as separate administrative departments within Luft Hansa and control the various internal short-distance routes. This arrangement had to be made because Germany is a collection of States which insisted during the formation of Luft Hansa that these regional companies and themselves should have some say in the new organisation and that their own needs for air transport should not be disregarded.

As a result of this Germany has to-day some 80 aerodromes which have been created in the last ten years and have been equipped in the most modern style. As a matter of fact, now that Luft Hansa has had to concentrate on long-distance traffic, several of these aerodromes will have to fall out of the air routes. They will, however, remain very useful for local flying and as air-taxi stations.

Major Wronsky asserts that the main duty of Luft Hansa is the linking up of Germany with the international European and World service of the future, it has built up the whole of its internal service with the idea of commercial co-operation. He considers that Europe has reached saturation point as far as air transport companies are concerned. Absolute co-operation on an international basis must persist as long as all companies live at the expense of the tax-payer.

As Germany has no colonies and as her position in the centre of Europe makes her the "air cross of Europe" Luft Hansa must create regular and safe connections between Germany and her neighbours, between the centre and the periphery of Europe for the furtherance of German trade. World Transport is demanded by World Trade and Germany wishes to participate in World Transport if only to those places commercially connected with Germany.

Major Wronsky said that education in all its various aspects is subsidised by the State. Transport and industry are inseparable and therefore the support of all forms of transport becomes a political and industrial necessity. Before air transport can receive such a subsidy it must prove that it is fulfilling a public duty.

He compared the different bases on which the German and British companies receive payment of subsidy, and said that Luft Hansa are now trying to get their subsidy paid on a ton-mileage basis. Imperial Airways have an advantage in that their subsidy contract is for many years whereas in Germany until 1929 the subsidy was fixed annually. Only since that date has a subsidy been granted for three years. The position is further complicated by the various sources from which as already explained support is received. Such support is only available for internal transport. For routes outside the country the Government alone pays.

Major Wronsky quoted figures to show that France spends about 13 times, and Britain nearly 16 times, as much as Germany on their air budgets. (The difference is of course because Germany has no Air Force and that only a proportion of the total subsidy comes from the Reich.)

He had some very illuminating things to say about air transport which must quite certainly be accepted if an increasing amount of passengers are to be carried. The aeroplane is speedy but during the last few years no increase in speed has been made. The punctuality is not 100 per cent. The aeroplane lacks the comforts to which the travelling public is accustomed in express trains, motor cars and express steamers, all of which should be found also in long-distance aircraft.

On a long flight a passenger must be able to read, write, smoke, converse and walk about. All aeroplane constructors must attend to these needs as well as the elementary affairs of safety and speed. Furthermore in the Winter and Autumn services are apt to be unpunctual and in the rush season the demand for seats often exceeds the supply, all of which goes further to convince the would-be traveller that air transport is unreliable and unsatisfactory.

Major Wronsky referred to the falling-off both in passengers and freight which has been noticed in Germany and a few other European countries during the last year. He says that neither the best organisation nor the most rational control can reduce expenses if the aeroplane constantly shows such a great disproportion between total weight and paying-load as is found to-day in all types. To this must also be added the high first, and maintenance, costs of engines and aircraft.

In all aerial transport concerns, about 85 per cent. of the purchasing capital is required for aircraft alone. The proportion of fixed to liquid expenses is about 55 to 45.

Of these fixed expenses, which include depreciation, insurance and fixed adminstrative-expenses, depreciation and obsolescence are outstanding and are about 50 per cent. of the fixed expenses. Insurance is also a big feature and amounts to about 10 per cent. of the fixed expenses. Administrative charges are only 6 per cent. Maintenance is is about 22 per cent. of the liquid expenses. Luft Hansa have been able to make some improvements here by increasing the hours between engine overhauls.

Ground organisation is an expensive business because of the large staff and expensive equipment which can only work to capacity during rush hours. This explains why Imperial Airways and K.L.M. can pay half their expenses from working receipts. The reason is because these two concerns have fewer aerodromes and a greater concentration of routes. The activities of Luft Hansa are more widely spread and so far Luft Hansa can only meet 40 per cent. of their working expenses from receipts.

Major Wronsky devoted a large portion of the later part of his lecture to results obtained by Professor Pirath, the head of the Technical High School at Stuttgart, who has made a theoretical investigation into Air Transport.

Pirath has found that air transport may be divided into three stages, routes under 500 km. (310 miles) routes between 500 km. (310 miles) and routes over 1,000 km. (620 miles). The third stage is the most profitable, though the second may be made to pay under favourable conditions. The Paris-London route which falls in the first category is an outstanding exception to the rule. Pirath of course confines himself to normal air speeds.

Major Wronsky says that Luft Hansa only intends to maintain their inner German system in so far as it brings actual advantages to the industry. They have an arrangement with the German State Railways whereby every aerial passenger, if he cannot start or has to break his journey *en route*, is entitled to continue to his destination by rail, first class, without additional charges.

In 1929 the passenger traffic decreased by 21 per cent. from 110,000 to 87,000, the routes were however reduced in this period by 14 per cent. On the other hand owing to special freight rates and action by the German postal authorities freight increased by 126 per cent. and postal traffic by 86 per cent. in the same period. For this reason such routes are to be extended. The German Post Office paid on the weight despatched.

The lecturer explained here that all the American lines were subsidised, internally by the postal authorities and abroad by subsidies on the distance flown.

He then gave details of a new scheme which has been giving excellent results whereby the railways work in conjunction with the air services, collecting and delivering goods from districts to which there are no air services. This more than doubled the service which Luft Hansa could offer.

The success of this system was only made possible by organising the postal and freight services separately from those which carried passengers. The most favourable routes have little postal traffic by day except for what we call evening papers. As soon as the time of departure was altered from day to night, the increase began. Luft Hansa therefore strongly advocates the extension of the night service and especially between Berlin, Paris and London.

Shortly Luft Hansa propose to organise a night service to Southern Europe. The service eastwards towards Russia has been working for two years. In 1928 Luft Hansa machines travelled over 250,000 km. (150,000 miles) on night routes and the regularity in the Summer months was 97 per cent.

Major Wronsky then devoted some time to an examination of accidents. He showed that the sensational newspaper reports are responsible for the exaggerated view that the man in the street takes of these events, whereas the colossal daily fatalities from traffic in the big cities pass unnoticed. (On a "passenger-mile" basis the fatalities in big cities are negligible.—Ed.)

By using a seaplane in conjunction with the mail steamers to North America the postal time between New York and Berlin has been reduced by something between 30 and 36 hours. A similar scheme, though more ambitious, is to be used for the route to South America. Machines will fly to the Canary Islands by way of Marseille and Seville and back. This is the first step towards the complete crossing of the Atlantic which will be flown by large flying boats. He is not too optimistic about trans-oceanic passenger-carrying because of the difficulty of providing adequate comfort.

Major Wronsky says that 80 per cent. of the total World trade crosses the Atlantic, and from Germany and Central Europe alone, the daily despatches of letters to North America are about 2,300 kgs. (5,000 lbs.), for South America about 500 kgs. (1,100 lbs.), and for East Asia (Japan and China) about 200 kgs. (440 lbs.).

He says that Luft Hansa believes that the airship will be valuable for such work and that they hope, in this coming year, to co-operate with the Zeppelin Works in opening the great aerial route to South America. Mail would be flown by aeroplane to a port in South Spain, and thence it would travel by airship to South America where aeroplanes of the Condor Syndicate would fly the mail to its destination. An air postal service is contemplated to the Far East and

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flights to Irkutsk (Siberia) and Pekin have proved this possible. The outstanding difficulties are political.

He concluded his lecture with a plea for international co-operation.

THE DISCUSSION.

SIR JOSIAH STAMP, the President of the Institute of Transport, and Chairman of the Meeting, said that Major Wronsky had no need to apologise for his English,—the percentage of casualties in his speech was even less than those on the German air-lines. He asked Colonel Sempill to propose a vote of thanks and Sir Sefton Brancker to second it.

COLONEL SEMPILL expressed the gratitude of the Royal Aeronautical Society to Major Wronsky for coming so far to read this paper. He recalled the paper read by Major Wronsky before the Society some years ago and said that many like himself would be astonished at the progress which had been made. He said that he welcomed this joint meeting with the Institute of Transport and hoped it might foreshadow further co-operation between the two Societies.

Major Wronsky was responsible for the idea of that big organisation, the Luft Hansa. He would like to know the extent of the night-flying mileage now, and when extended later in the season. What kind of organisation had the Luft Hansa for this? He asked whether flying-boats were, or would be, used for night flying, and what services used flying-boats other than the proposed route to South America. What type of flying-boat was being developed in Germany and would the Do.X. and the Romar be used?

Was there a growing tendencey to use air-cooled instead of water-cooled engines? Were there any joy-ride and air-taxi concerns other than the Luft Hansa? What were the times between main and top overhauls. In proposing a very hearty vote of thanks he said that they welcomed Major Wronsky now and at all times.

SIR SEFTON BRANCKER said it gave him great pleasure to welcome Major Wronsky, who was an old friend, and like himself had been in Air Transport since its start. But Major Wronsky had achieved more, for he was the most experienced man in the World on Air Transport, which must be international. They were both agreed on the Freedom of the Air, each country should develop its own air-routes and ground organisation, which would then be available for use by all countries.

The British Government in their new agreement with Imperial Airways made arrangements whereby they did not require repayment of the subsidy, but had become shareholders and would take their profits in the ordinary way.

His own opinion was that a subsidy was basically unsound. The British Government choose the horsepower-mileage basis as they hoped thereby to achieve higher-powered machines,—the company would see to the ton-miles, as the company's interest was to fly machines as fully-loaded as possible.

He wished that local authorities in England would contribute to local air lines as they do in Germany.

He suggested that the time had come for a concentration on increasing the speed of air transport and increasing the frequency of service. The machines developed for such a purpose should be of limited size,—except for flying-boats which must be big enough to be seaworthy.

Referring to Major Wronsky's dictum about depreciation he asked whether this was not too high, seeing that at Tempelhof aerodrome recently he saw D.1 which was licensed in 1919 and since then has flown 800,000 miles and is still going strong.

He pointed out that the longer the air line the better chance there was of making it a paying proposition, but unified control was essential. He did not think that London would remain the central aerodrome for England, it would be the base for Imperial Communications. He foresaw the time when the base would be in the North which was especially likely if a service was opened between Hull and Hamburg.

He congratulated Major Wronsky on the success of his night-flying. For the last two years in this method of flying Germany had been leading the way. Before concluding his remarks by seconding the vote of thanks he expressed his great confidence in Luft Hansa.

MR. HANDLEY PAGE said that the lack of Colonial possessions had not prevented Germany from producing those two magnificent ships, the *Bremen* and *Europa*, and so he did not see how the loss of such possessions could adversely affect her air-lines.

He thought that more attention should be paid to the question of developing aircraft and engines which would make air transport a paying proposition, and he suggested that less Government support in the shape of subsidy should be given to the air-lines and this money diverted to research on economic types.

He congratulated Major Wronsky on the success of night-flying. This was indeed essential for a postal service which must leave at night so that there might be an early delivery next morning. He referred to a recent leading article in an aviation paper which drew attention to the fact that no British air-line was operating in South America. He explained this by saying the British Government would not subsidise such a line. [Scadta, the successful Colombian line, and the Condor line on the East Coast, are not subsidised by the German Government.—ED.]

SIR DENNISTOUN BURNEY asked whether the falling-off of passengers to which Major Wronsky referred was due to air-sickness? He asked whether any records had been kept to show the difference in air-sickness among passengers in normal-size machines and large ones like the Do.X. He said that without real co-operation flying could never be a success, customs and other similar interferences must be removed.

BRIG.-GEN. SIR H. OSBORNE MANCE suggested that a night route from Berlin should be inaugurated which would enable the passengers to catch the night-boat from Holland. This, he said, would allow the man who usually travelled by train to spend the afternoon in Berlin which would otherwise not be possible. He asked whether in the future air-ports would be owned by the State, or by the operating companies, or, as with our own docks, by independent concerns? He foresaw the coming of the air-lorry,—would this use the aerodromes of the main air-routes or would they have to use aerodromes of their own? Was there any international method of regulating licences?

MR. G. WOODS HUMPHERY suggested that co-operation was required rather between governments than companies and said that each aircraft flying over the air route to India had to carry a despatch case 6 in. thick filled with papers. He wished that more money could be spent on research for aircraft and engines. He said that contrary to popular belief Imperial Airways did do a certain amount of night flying. Every week the machines on the route to India flew a certain distance by night. [Merely because they are so slow, or start so late, that they cannot keep to schedule by flying only in daylight.—ED.]

COLONEL EDWARDS said that he had been told by Major Wronsky that towns had to be persuaded in Germany not to give subsidies, as they were in such positions that an air route could not serve them. The reverse was the case in England and when local authorities had been persuaded to provide an aerodrome, their first effort was to obtain a return for their expenditure in a high rent. Municipalities spent money on roads from which there was no direct return, why should they not spend money on aerodromes?

MR. L. A. WINGFIELD said that 1929 had been an outstanding year in the History of Aviation. There was the drawing-up at Warsaw in October of the International Air Code which would considerably facilitate the work of operators and insurers, and there was the formation in this country of the Guild of Air Pilots and Navigators which had been formed to ensure a high professional standard for qualified pilots and navigators. He said that training in blind-flying would have to be provided by the Government or by the Guild.

MR. C. C. WALKER, of the De Havilland Aircraft Co. Ltd., referred to the very high cost of air transport. He said that a large proportion of such a cost was due to the cost of aircraft and engines which had been developed from war types. At the moment air transport companies were paying from £1,000 to £1,500 per seat for a passenger-carrying machine. He said that if companies would come down to smaller sizes and buy machines ex stock instead of having something built to their own specification, this price could be reduced from £350 to £700 per seat. Engines would become cheaper too.

MAJOR WRONSKY, in his reply, said that the night-flying routes this year would be increased by routes from Berlin to Hannover and Cologne (Köln) and with the co-operation of the French and British companies to Paris and London. There was no night flying by flying-boat. A Dornier Wal would be used for the route to the Canaries. Wals and Super-Wals were used on the routes to Norway and Sweden. The Romar and Do.X. were only under trial. He thought that more air-cooled engines were in use now.

There was no air-taxi service other than that provided by Luft Hansa. He said that the sea was available to everybody but the air was only available by having suitable landing grounds and in Germany's case those outside Germany were all on foreign soil.

He explained that the falling-off in the number of passengers could not possibly be due to air-sickness because till last year the figures had steadily increased. Air-sickness was certainly less in big machines than small. All airports, even the Tempelhof, were owned by the municipalities, who sometimes formed small companies to operate the airport in which the States and even the Reich might take up shares. He said that some of the conditions in the Warsaw Convention were such that he did not see how the companies were to continue to operate. There would never be aerial lorries because the whole essence of air transport was speed and so there could be no call for occasional traffic of this kind. [Surely the successful goldfields air service in New Guinea is a regular aerial lorry service.—ED.]

A ROYAL PASSAGE BY AIR.

The Baghdad correspondent of *The Times* states that the King of the Belgians arrived there on Mar. 15 in an Imperial Airways' aeroplane at the conclusion of a 10 hours' flight across the desert from Cairo. Before landing the aeroplane circled round the city.

The King's arrival was unofficial, but he was welcomed at the aerodrome by a representative of King Feisal, by the High Commissioner, Sir Francis Humphrys, and by Air Vice-Marshal Sir Robert Brooke-Popham, A.O.C. all British forces in 'Iraq.

The King is making Baghdad his headquarters and will be the guest of the High Commissioner. He will visit Babylon and other sites of ancient cities during his stay in 'Iraq, and will return to Cairo by air on Mar. 21.

One gathers that his pilot was Major H. G. Brackley, D.S.O., D.S.C., who is in charge of the Middle East Section of the activities of Imperial Airways Ltd.

THE GUILD OF AIR PILOTS AND NAVIGATORS.

A Meeting of the Court of the Guild was held at 35, Maiden Lane, W.C., on Mar. 12. The report of the sub-Committee (appointed to consider the question of associate membership), consisting of C. R. McMullin, Norman Macmillan, L. A. Walters, and the Clerk, was received.

The Committee recommended the proposal, subject to the limitations which they mentioned. In considering the class of person to be admitted as Associate Member they thought that (a) he must be a British subject, (b) he must be engaged in Commercial Aviation.

The Committee were of opinion that an applicant should be definitely, though not necessarily wholly, earning his livelihood as a pilot or navigator of aircraft.

They further recommended that an Associate Member should have no vote on any question affecting the conduct or management of the Guild and should pay a subscription of £2 2s. per annum.

He would be able to apply at any time for membership on satisfying the Court that he had the necessary qualifications.

After discussion it was resolved that the matter remain in abeyance for 12 months.

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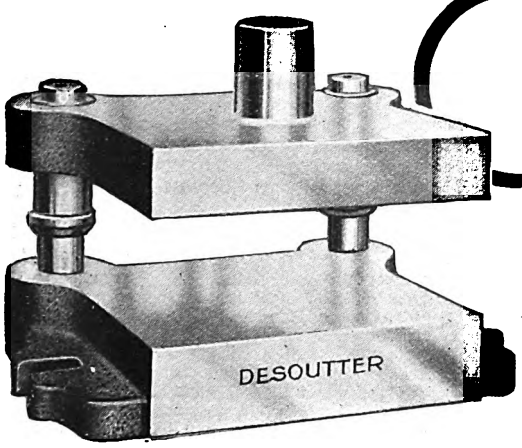

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THE LONDON TERMINAL AERODROME.

ANALYSIS OF FIGURES FOR PAST WEEK.

Trips per Day.—Sunday, 9; Monday, 14; Tuesday, 16; Wednesday, 22; Thursday, 18; Friday 21; Saturday, 19.

IMPERIAL AIRWAYS LTD.:

London—Egypt—India: London—Le Touquet—Paris—Basle—Zurich: London—Ostend—Brussels—Cologne and return: Machines 39, passengers 211, freight 14¾ tons. India Route: Inward, passengers 0, mail 604 lbs.; outward, passengers 0, mail 700 lbs.

AIR UNION:

Paris—London: Machines 35, passengers 62, freight 9½ tons.

K.L.M.:

Amsterdam—Rotterdam—London: Machines 12, passengers 27, freight 6 tons.

SABENA:

Brussels—London: Machines 15, passengers 29, freight 2¼ tons.

DEUTSCHE LUFT HANSA A.G.:

Amsterdam—London: Machines 14, passengers 45, freight 2¼ tons.

MISCELLANEOUS:

British machines 4, passengers 4.

Foreign machines 0, passengers 0.

Total number of trips by British machines, 43, carrying 215 passengers. Foreign machines 76, carrying 163 passengers.

COMPARATIVE FIGURES.

Week ending Mar. 15:
Machines, 82; Passengers, 378; Crews, 307; Total personnel, 685.
Corresponding week, 1929:
Machines, 82; Passengers, 406; Crews, 163; Total personnel, 569.
Corresponding week, 1928:
Machines, 111; Passengers, 429; Crews, 210; Total personnel, 639.
Corresponding week, 1927:
Machines, 70; Passengers, 284; Crews, 116; Total personnel, 400.
Corresponding week, 1926:
Machines, 94; Passengers, 262; Crews, 116; Total personnel, 378.
Corresponding week, 1925:
Machines, 74; Passengers, 200; Crews, 90; Total personnel, 290.
Corresponding week, 1924:
Machines, 98; Passengers, 255; Crews, 166; Total personnel, 421.
Corresponding week, 1923:
Machines, 71; Passengers, 234; Crews, 122; Total personnel, 356.
Corresponding week, 1922:
Machines, 50; Passengers, 129; Crews, 84; Total personnel, 213.
Corresponding week, 1921:
Machines, 44; Passengers, 168; Crews, 62; Total personnel, 230.

CROYDON NOTES.

The steady expansion of Imperial Airways' Organisation, which now embraces the Empire Air Route from Cairo to Cape Town, has given them many new problems to face, not the least of which is how to get enough people capable of holding down responsible positions in countries, and under conditions, which differ entirely from those of Europe. This problem they have tackled in an eminently practical way by starting a school at Airways House, which resembles that of Mr. Squeers only in the fact that when the pupils "know it from the book, they goes and does it." In other words, the instruction is both theoretical and practical.

Each year a number of apprentices between 17 and 21 years of age are to be taken on and put through a course of training lasting two years in all. The first month is to be spent attending lectures given by Heads of Departments at Airways House on every branch of commercial aviation, and at the same time evening classes on ordinary commercial subjects are to be taken. At the end of each week examination papers are to be set, and a high standard of marks is expected.

After the first month at Airways House the apprentice spends a considerable time in the different Departments at Croydon Aerodrome, as well as at Airways House, and at least three months is spent on one of the Foreign (European) stations.

The last six months of the course is to be spent at one of the Divisional Headquarters of Imperial Airways, and then the apprentice is supposed to be ready for anything.

Put him on a Station in Darkest Africa and he will know exactly what to do if lions chase his passengers away into the bush, thus causing a late departure, or if white ants eat the aircraft in the night, thus necessitating the cancellation of the service.

The system is very sound from Imperial Airways' point of view, and there should be no difficulty in getting the right sort of boy straight from the big public schools.

Far be it from us to harp (or carp) on the Loud Speaker menace mentioned last week, but we must just quote a recently discovered paragraph in the various Companies' leases of Main Hall Offices.

The tenants shall and may peaceably and quietly hold and enjoy the said premises . . . . without any lawful interruption or disturbance from or by the President (of the Air Council) or his assigns.

It is obvious that there will be no peace, quiet or enjoyment of anything, and that we shall be perpetually interrupted and disturbed by the loud speaker in the Main Hall.

The President's only loophole seems to be that nothing is said in the leases about *unlawful* interruption and disturbance. If loud speakers are not unlawful means of oppression, they certainly ought to be, and it makes the blood boil and the throat go dry to think that while there is absolutely no close season for loud speakers, the comparatively noiseless hobby of drinking is rigorously hampered by all manner of irksome restrictions as to hours.

There is a lot of fuss at present about the Channel Tunnel, and experts seem to think it will take about ten years to complete, and then you will be able to get to Paris in five hours.

Well! Well! By that time you will probably be able to fly there in about half an hour, so why worry with a project which our Victorian ancestors grew weary of and cast aside as useless? [Our Victorians turned down the Channel Tunnel scheme solely because in those days we were afraid of France.—ED.]

According to the Air Estimates an unholy alliance has been entered into between the Air Force and the Army, who have each paid £2,600 of the taxpayers' money into a common frightfulness fund with which they propose to man and equip Dungeness as an Experimental Air Defence Station. As Dungeness is right on the commercial air routes to the Continent we cannot but view the matter with misgivings.

War Office Willie and Air Force Alf will be at Dungeness with packets of nasty high explosives, and lots of guns, and will have no target. One day the temptation will be too strong and some unfortunate Golden Ray, Silver Wing, or Fokker will be greeted with a perfect hail of canister, grape, chain shot and red-hot cannon balls.

As a matter of fact we do wish they had chosen some other place to play soldiers at, because we shall be seriously inconvenienced if Dungeness and a large area around it is put out of bounds for aircraft fairly frequently while they let off their fire crackers.—SPRY.

THE LONDON TERMINAL AERODROME.

In the House of Commons on Mar. 5, in reply to Mr. Wardlaw-Milne, the Under-Secretary of State for Air said that the question of the provision of a more central aerodrome for London than Croydon had been fully considered by the Civil Aviation Advisory Board who had presented their report in January, 1923 (Cmd. 1816), and on their recommendation Croydon aerodrome had been retained as the London Terminal Aerodrome and had been enlarged and improved. Careful consideration would be given to this problem.

AN IMPENDING INVASION OF INDIA.

An American citizen, Mr. H. M. Cox, of Bengal, India, has written to the Stearman Aircraft Co., of Wichita, Kansas, U.S.A., urging the company to send an advance agent to India to "begin the development of the fertile sales field" there.

He also expressed the belief that there is not a single factory or agency selling aircraft in India.

The letter has been referred to the United Aircraft Exporting Corporation, of New York, which corporation, in addition to handling Stearman foreign sales, also handles Vought, Hamilton, Sikorsky, and Boeing aircraft, Pratt and Whitney engines and a host of aircraft accessories, hangars, airport equipment, etc.

Mr. Cox is wrong with regard to the lack of aircraft agencies in India as several British firms are represented there, but the above is merely given to show that there are foreign countries who are likely to take an interest in fields which should be primarily British.

A DIMENSIONAL ERROR.

The following letter is published, with due regrets that the writer thereof should have been mis-interpreted:—

SIR,—The account given in THE AEROPLANE of Mar. 12 of the discussion on the lectures before the Aeronautical Society on the Townend Ring shows such a misunderstanding of what I actually said during that discussion that I trust you will allow me to rectify the matter.

In the first place I am reported as doubting whether the ring had any effect in increasing the ceiling. What I actually doubted was not this but an implied reference in Mr. Townend's paper that the ceiling was increased partly because the *maximum lift* was also increased by the ring, and I asked for confirmation of the statement that maximum lift was actually increased.

In the second place I drew attention to the effect of the ring in spinning pointing out that its position in relation to the centre of gravity of the aeroplane is usually such that it will add to the inertia pitching moment which tends to keep an aeroplane in a spin. This is true and is simply a matter of applied mechanics. The moment in question arises from the centrifugal forces on the ring in different parts of an aeroplane due to the rotation in a spin, and is one of the most important factors in spinning; it is the existence of this moment which in some aeroplanes causes them to become "locked" in a flat spin in which the incidence is far greater (of the order of 45° to 60°) than would normally be possible. I added that I did not think that this effect of the ring would be large or important but that it was worth bearing in mind.

From your comments I infer that you have considered the mass of the ring merely as an extra weight placed well forward, which will naturally exert a moment putting the nose down; but surely one ought to consider the effect of the ring after the centre of gravity has been adjusted to be in the same position in relation to wing chord as without the ring.

(Signed) H. B. IRVING.

[In fact one was considering the side area of the ring, which is considerable, and not its weight.—C. G. G.]

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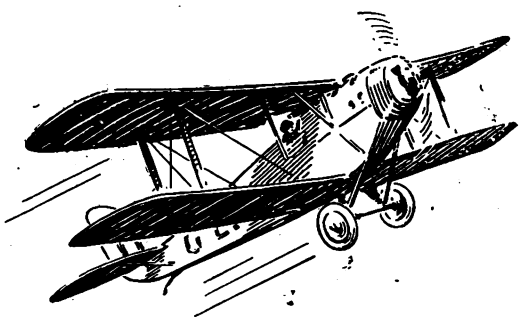

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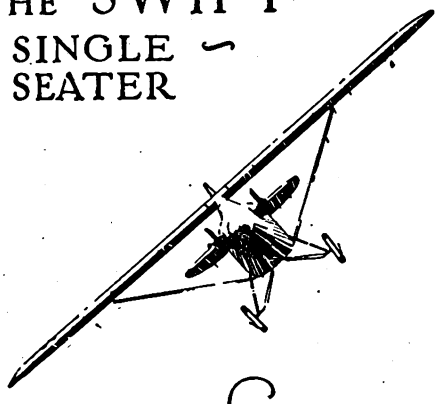

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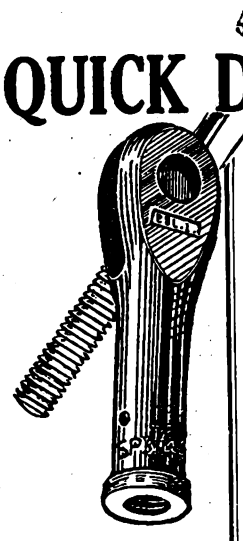

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"THE BRISTOL REVIEW."

The Bristol Aeroplane Co. Ltd., are to be congratulated on the first number of *The Bristol Review*, which is devoted to the latest developments of the Bristol aero engines and to all other matters of interest to those using or otherwise connected with these engines.

The first article is an excellent description of the Bristol Jupiter "F" series engines. It explains the manner in which the increased performance of this series has been gained. At the end is a schedule, which prospective buyers will find useful. In it the specifications of the various types of the "F" series are set out in tabular form.

Mr. A. H. R. Fedden, the designer and driving force behind the production of the Bristol engines, contributes an article on Air-cooled Aero Engine Development in the Immediate Future, which is reprinted by kind permission of *The Times*. In this article Mr. Fedden gives ample ground for his contention that the future holds much for the air-cooled radial. He frankly admits that, for speed alone, water-, dope-, or steam-cooled engines have the advantage. There are two very attractive pictures in this article, showing a Short Calcutta.

There is a brief account with illustrations of the Dornier Do.X., the largest flying-boat in the World, which has geared Jupiter engines.

A particularly interesting article is one on "The Facts About Mineral Oil for Jupiter Engines," in which the case for both vegetable and mineral oils is clearly put, together with their respective advantages. The Company frankly give their own experiences with these oils.

Of particular interest too, from the maintenance standpoint, are the notes on dismantling, overhauling and reassembling the Jupiter "F" type reduction gear. This is clearly illustrated with really good section drawings.

The Bristol Rubber Buffer Mounting is described. This is a device similar to those which various people have tried at various times for isolating the power-unit from the fuselage by means of rubber buffers between the engine-plate and the bulkhead.

The Bristol Automatic Boost Control Unit and Bristol equipment for measuring cylinder temperatures, are also fully described.

Presumably the *Review* is published in English only because the expense of printing it in all the languages of all the countries in which Bristol engines are used would be prohibitive. But one strongly recommends all who can read these notes to write to the Bristol Aeroplane Co. Ltd.—at Filton, Bristol, England. A copy will be sent post free.

WIDER STILL AND WIDER.

The Stockholm correspondent of *The Times* reports that on Mar. 7 the Swedish Government accepted a proposal by the Swedish Air Board for an agreement with the Bristol Aeroplane Company Ltd. for the manufacture under licence of Bristol aero engines in Sweden. The agreement will probably be valid for ten years.

The report continues that this proposal is the outcome of long negotiations between the Swedish Air Board and various British and American firms. The engines are intended exclusively for military aircraft.

For some years now the Swedish Government have given continuous attention to the choice of an aero engine for manufacture in their country. They have made a complete review of the whole position, and as a result there has been keen competition among European and American aero-engine constructors to bring the merits of their engines to the attention of the Swedish Authorities. Competition was so keen that at least one firm offered to build at its own expense a factory in Sweden for the manufacture of its engine.

The Swedish Government have purchased in the last few years a considerable number of Jupiter engines, so one may conclude that their selection of this type has only been made after a very complete experience of the results which are obtained from the Jupiter engine under actual service conditions.

Bristol engines are now built under licence in Canada, France, Italy, Germany, Belgium, Chechoslovakia, Jugoslavia, Portugal, Switzerland, Hungary, Spain, Poland, Japan, and the United States of America. To this imposing list must now be added Sweden. One wonders whether any other manufactured product has ever been licensed so extensively.

AIRCRAFT LACQUERS.

Titanine-Emaillite Ltd. have produced some new cellulose lacquers for aircraft, in black, white, grey, and cockpit green. The lacquers may be applied either by brush or by spray, and conform to D.T.D. Specification, No. 63. They can be applied to all metals, and they give a highly durable finish, which resists oil, petrol, and sea-water.

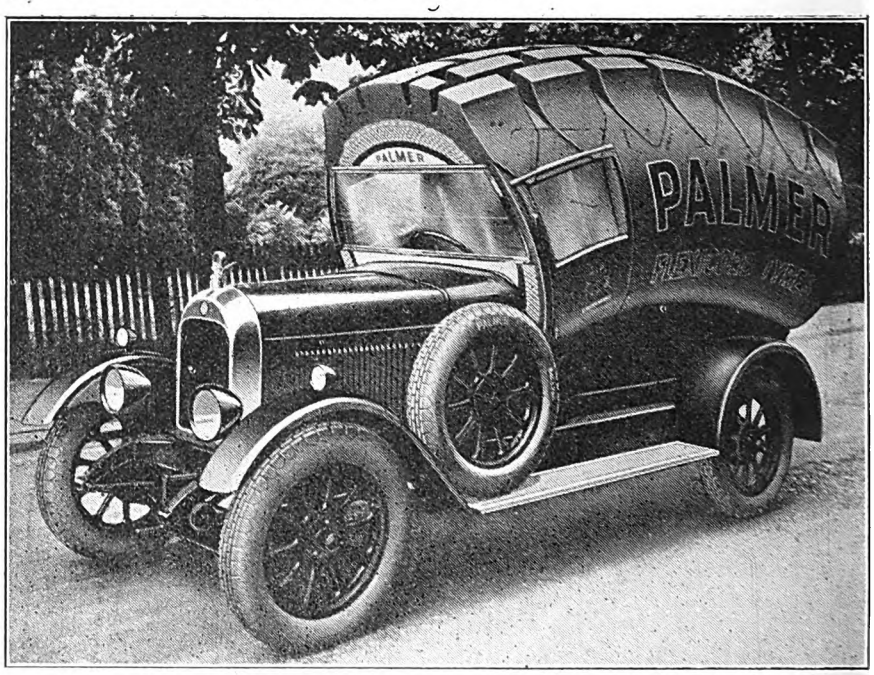
Only one coat is required. The lacquer dries quickly, as only 20 minutes is required for spray application, and one hour for brush. The increased weight amounts to ¾ oz. per sq. yd. A gallon of lacquer will cover, with one coat, approximately 25 sq. yds.—M. S.

PALMER ENTERPRISE.

Over twenty-five years ago, in the pre-historic days of aviation, the Palmer Tyre Ltd. had delivery vans with bodies built in the form of a section of a motor-tyre. Even to-day, when quite a number of commodities are so advertised, enterprising manufacturers still find the extra expense to be justified.

The illustration shows one of a new fleet of delivery vans recently put into service by the Palmer Company. Those who seek for signs and omens will notice that the tyre section has the famous five-bar tread which will suggest that the Palmer Company believe this has come to stay.

Will some ingenious designer ever be able to overcome the demands of aerodynamics and fuselage shapes in this fashion for advertising purposes. The nearest to date were the broomsticks bestridden by witches. What a chance this should be for the makers of a brand of mops! There certainly seem to be possibilities for makers of aircraft parts and material to use aeroplane forms for their delivery vans.



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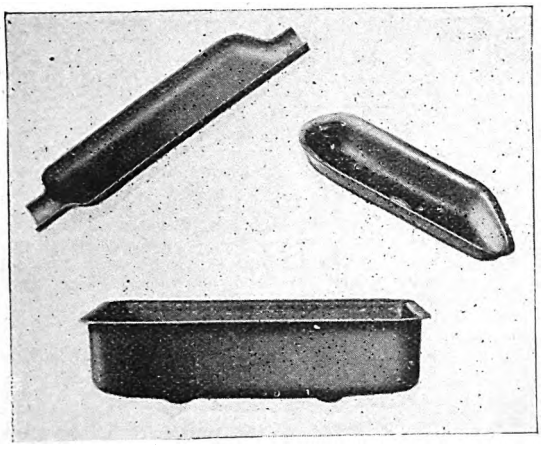

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A NEW AUSTRALIAN AIRCRAFT COMPANY.

A new company, known as the General Aircraft Co., has been formed in Sydney, N.S.W., and this company's factory, which is situated just outside the boundary of Mascot aerodrome, is now in full working order.

The company builds D.H. Moths under licence, all kinds of reconstruction work is undertaken, airscrews are made to any specification and a new aeroplane has already been completely designed and built on the premises.

This machine is a three-seat light biplane, very much on the lines of the Moth, but with a Cirrus-Hermes engine. The two passengers are seated side-by-side in the front cockpit. By preliminary tests this machine is said to have made a top speed of 110 m.p.h. and to have shown a climb equal to that of the Gipsy-Moth.

The company has also designed and made an airscrew-making machine and with this machine they are turning out airscrews of all types with great success.

ON PACKING PARACHUTES.

There is a story of the late Corporal Dobbs, parachute expert in the R.A.F., that to explode the theory that a badly packed parachute was dangerous he bundled an Irving parachute into its pack anyhow, went up and jumped quite safely. That action, incidentally, was characteristic of the impetuosity cultivated by his unrivalled experience. Despite the experimental nature of most of his official work on parachutes he had reached that stage of confidence when falling from aircraft was as uneventful to him as walking is to us.

Personal experience of parachuting is needed to appreciate that such can be a normal state of mind. Even those who understand how efficient the modern parachute has become feel a human disinclination to believe that a man can enjoy the experience, but it is a fact that the R.A.F. experts revel in the game of parachuting and will jump as many times a day as you like to ask of them.

Packing a parachute is regarded with unnecessary apprehension. Dobbs' test, although exceptionally defiant, is a fair method of allaying it. His parachute could not have been packed more carelessly yet it functioned efficiently. A packed parachute does give the impression that the job is done too well, considering that the parachute has to escape completely and quickly. It looks far more secure than nine postal parcels out of ten.

This security is as essential as an easy exit. For the greater part of its lifetime the parachute is merely an equipment bundle put on and thrown off and subject to natural wear and tear. Therefore the silk canopy and shroud-lines must be well protected. The pack must not accidentally open when subject to normal wear and tear. It must certainly be protected from premature release while the aviator is still in his cockpit.

Packing seems a complicated business if you have not seen a parachute closely or haven't one before you. Certainly they should be treated respectfully, but not with apprehension.

The chief precaution is to keep the canopy and shroud-lines clear of each other. That is almost a matter of common sense. They almost ask not to be entangled.

Of course the design of the pack puts you right. There are open pockets into which the shroud-lines are looped. The canopy then lies above them, layer upon layer.

The whole question of any potential dangers in packing was summed up by a famous parachute manufacturer as follows: "I don't care how my 'chute is packed or who packs it. As long as common sense is used in keeping the canopy and shroud-lines clear they won't come to any harm."

An additional safety feature in some parachutes (the Irving, for example) is the pilot 'chute, the miniature canopy, 30 inches in diameter, attached to the parachute apex by a shroud-line. Its steel ribs embody a spring which is compressed when the little 'chute is inserted in the pack above the parachute. It springs out as the pack opens and drags the parachute after it. The latter has no option. So in this respect the pilot 'chute is a safety measure against careless packing.

Irrespective of the merits and demerits in various parachute designs one lesson is clear; that the best types of modern parachutes have proved their claims to a permanent place in the airman's equipment. Only last year nineteen R.A.F. airmen saved their lives with Irving parachutes.

BACK NUMBERS.

A reader of The Aeroplane wishes to dispose of some back numbers. Those in hand are bound volumes 1916-1923, almost complete, 1924-1925 complete, and unbound numbers of 1926-1929 inclusive complete. Offers should be sent to E. Palmer, 38, Cromwell Avenue, Highgate, N.6.

PERSONAL NOTICES.

Deaths.

BARKER.—On Mar. 12, at Ottawa, Canada, as the result of a flying accident, Lieut.-Col. William George Barker, V.C., D.S.O., M.C.

William George Barker was born in 1894 at Dauphin, Manitoba, and was educated at Dauphin College. He joined the Army in November, 1914, and went overseas with the 1st Canadian Mounted Rifles. He was transferred to the Royal Flying Corps in December, 1915. He was awarded the Military Cross in November, 1916, for contact patrol work at the capture of Beaumont Hamel and a Bar to the Military Cross for similar work in 1917.

He was made a Companion of the Distinguished Service Order in January and received a second Bar to the Military Cross in April, 1918, and a Bar to the D.S.O. in July, 1918. He was also awarded the French Croix de Guerre and the Italian silver medal for military valour. The award of the V.C. at the end of 1918 was described in the *London Gazette* as follows:—

"On the morning of October 27, 1918, this officer observed an enemy two-seater over the Forêt de Mormal. He attacked this machine, and after a short burst it broke up in the air. At the same time a Fokker biplane attacked him, and he was wounded in the right thigh, but managed, despite this, to shoot down the enemy aeroplane in flames. He then found himself in the middle of a large formation of Fokkers, who attacked him from all directions, and was again severely wounded in the left thigh, but succeeded in driving down two of the enemy in a spin. He lost consciousness after this, and his machine fell out of control. On recovery, he found himself being again attacked heavily by a large formation, and, singling out one machine, he deliberately charged and drove it down in flames.

"During this fight his left elbow was shattered and he again fainted, and on regaining consciousness he found himself still being attacked, but, notwithstanding that he was now severely wounded in both legs and his left arm shattered, he dived on the nearest machine and shot it down in flames. Being greatly exhausted, he dived out of the fight to regain our lines, but was met by another formation, which attacked and endeavoured to cut him off, but after a hard fight he succeeded in breaking up this formation and reached our lines, where he crashed on landing.

"This combat, in which Major Barker destroyed four enemy machines (three of them in flames), brought his total successes up to 50 enemy machines destroyed, and is a notable example of the exceptional bravery and disregard of danger which this very gallant officer has always displayed throughout his distinguished career."

[Col. Barker will be deeply regretted by all who knew him. Unlike some popular heroes, he was very modest and entirely free from side. Also he was perfectly straight on a business deal and thoroughly deserved whatever success came to him. He was just the same in the R.F.C.,—he never boasted of his victories, and nobody ever doubted the accuracy of his combat reports. Modesty and honesty were his strongest characteristics.—C. G. G.]

MURRAY.—On Mar. 10, at Hall Bank Gate, Cumberland, Denis Murray (late R.N.A.S.), eldest son of Professor Gilbert and Lady Mary Murray, age 40.

Mr. Denis Murray joined the R.N.A.S. during the War and in February, 1915, was shot down into Dutch waters and interned in Holland until the Armistice. He was, through his mother, a grandson of the late Earl of Carlisle.

WALKER.—On Mar. 11, at the Officers' Hospital, R.A.F., Uxbridge, of pleurisy and double pneumonia, Flg. Off. Frederick Benjamin Goddard Walker, the beloved and only son of Frances A. Walker and of the late W. F. Walker, of Somerville, Stone Road, Broadstairs, aged 26.

Mr. Walker joined the R.A.F. with a short service commission in September, 1925, and after a course of flying training at No. 5 F.T.S., Sealand, he was posted to No. 56 (Fighter) Squadron. In March, 1928, he was posted to the Night Flying Flight at Biggin Hill and in February, 1929, he was posted to the Staff of the R.A.F. Depot at Uxbridge.

Marriages.

DON—BIRKBECK.—The marriage took place at North Elmham Church, Norfolk, on Mar. 11, of Wing Cdr. Francis P. Don, R.A.F., third son of the late Mr. Robert B. Don, of The Lodge, Broughty Ferry, and Miss Angela Jane Birkbeck, only daughter of the late Mr. Edward L. Birkbeck and of Mrs. Edward Birkbeck, of Elmham House, Norfolk.

WILTSHIRE—GOURLAY.—On Mar. 10, at South Kensington, William Percy Wiltshire, R.A.F., eldest son of Mr. and Mrs. William Wiltshire, Sandrock, Farnham, Surrey, to Jean Summers Gourlay, second daughter of the late Robert Gourlay, of Kirkcaldy, Fifeshire, and of Mrs. Wessels.

Births.

BENNETT.—On Mar. 12, to Violet, wife of F. I. Bennett, of Kingston Hill and the H. G. Hawker Engineering Co. Ltd.—a daughter.

HAMPTON.—On Mar. 13, at Digby, Lincolnshire, to Marjorie, wife of Flt. Lt. H. N. Hampton, D.F.C., R.A.F.—a son.

VASSE.—On Mar. 15, at 1, Spencer Parade, Northampton, to Kathleen, wife of Flt. Lt. G. H. Vasse, R.A.F.—a daughter.

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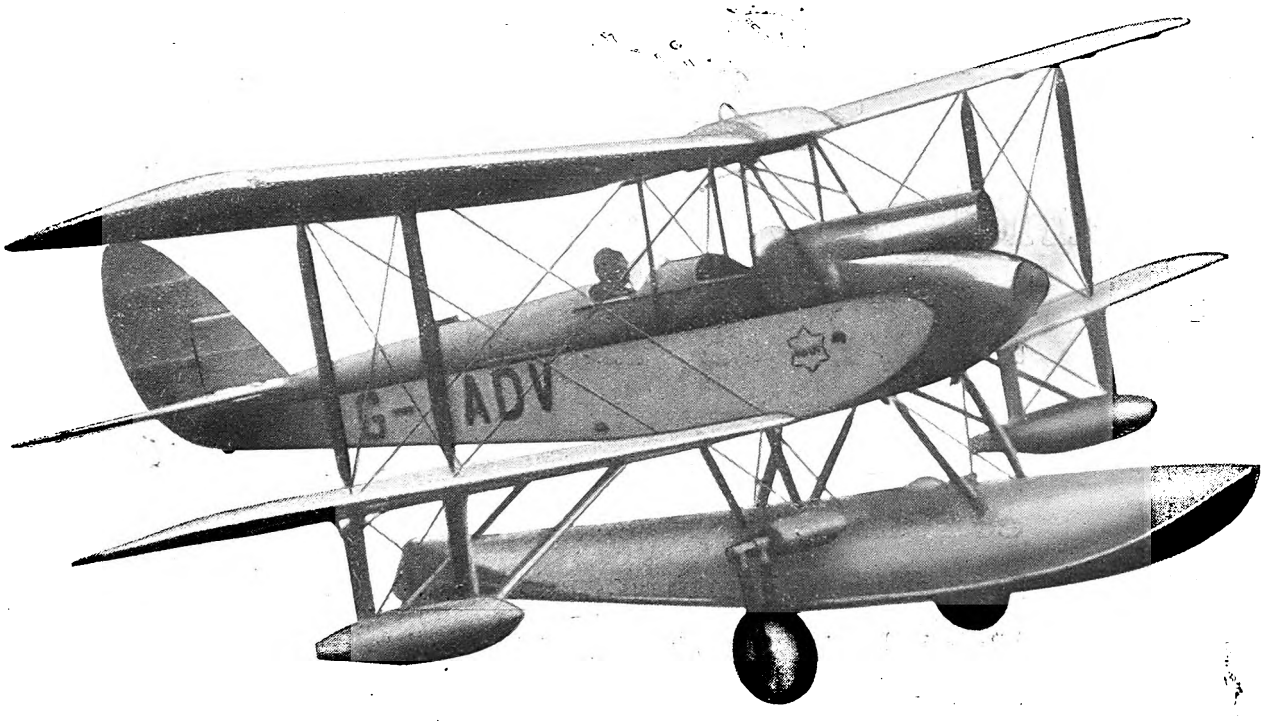

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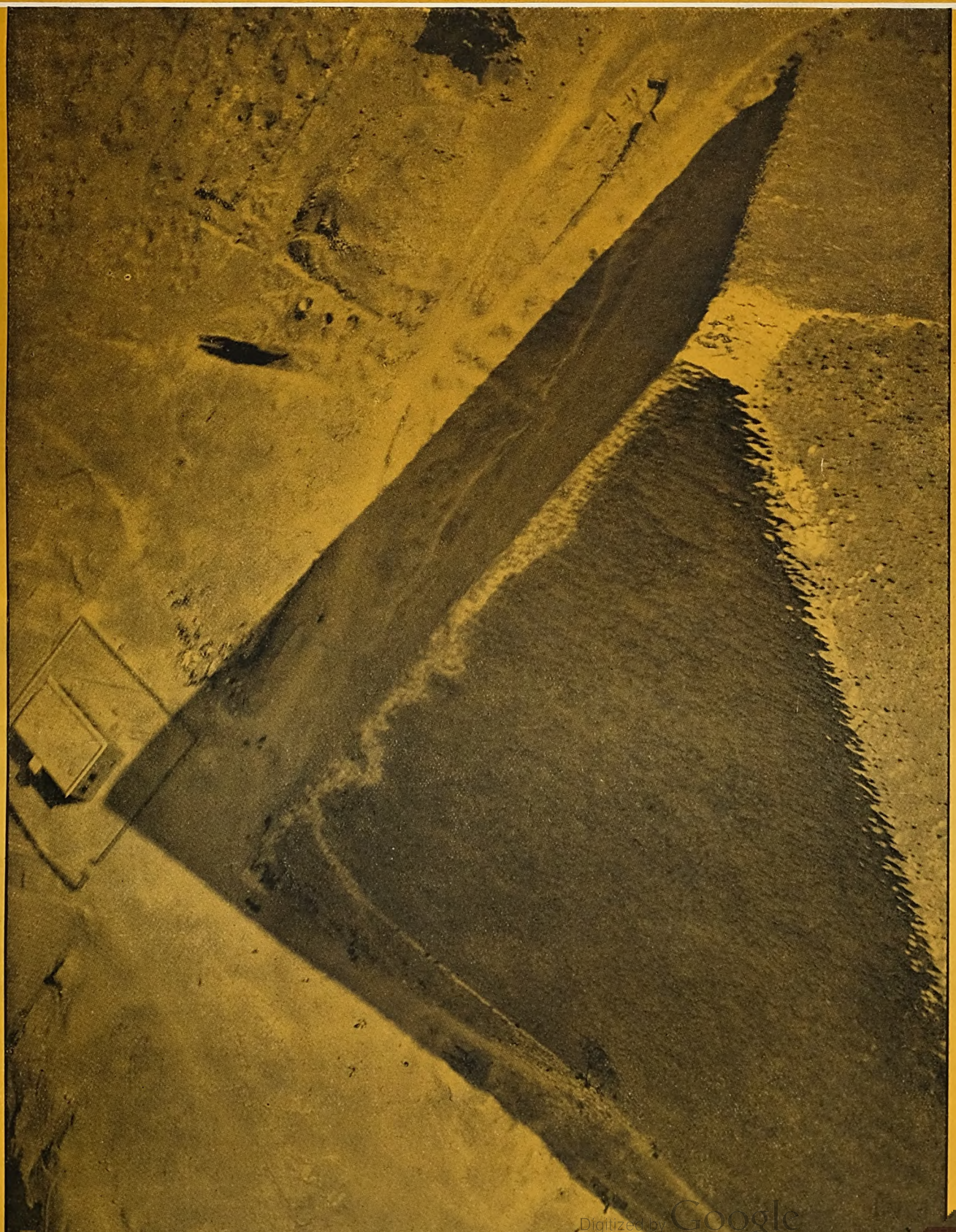
Edited by
C.G.Grey



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ON THE AIR ESTIMATES.

On Tuesday, March 18 Mr. Frederick Montague, Under-Secretary of State for Air, introduced his first Air Estimates. He deserves to be congratulated on both the manner and matter of his speech.

Unfortunately the space available in THE AEROPLANE only allows of the publication of a very condensed version of the Debate on the Air Estimates. Those who are keenly interested ought to buy a copy of the Official Report of Parliamentary Debates in the House of Commons published by His Majesty's Stationery Office and commonly known as "Hansard." There they will find all the speeches reported word for word.

A character in one of Oscar Wilde's plays says to another "Read 'The Peerage,' my boy, read 'The Peerage.'—It's the finest thing in fiction the English have ever done." Hansard could quite often compete for that title, not because of any inaccuracy on the part of the present embodiments of the excellent late Mr. Hansard but because of the inventiveness of speakers in the House. As a matter of fact, anybody who took the trouble to buy Hansard every day, price 6d., would get far more amusement and far more inside information out of it than he would out of sixpennyworth of daily papers, for, although many of the statements of Honourable Members are utterly inaccurate, they are no more inaccurate than is the average daily paper and there are all kinds of political and social and international bits of information in Hansard very often put by innuendo in the form of a question which *no* daily paper would ever dare to publish at all.

DISCLOSURES.

None of these remarks apply to Mr. Montague's excellent speech except that his speech did definitely disclose things which ought to have been in all the papers when they happened and were almost entirely ignored. For example, he told how the R.A.F. has been showing the Flag abroad and doing good work at home without any publicity. In these days when the British Aircraft Industry wants all the propaganda it can get, surely the Air Ministry might disclose information which could be distributed in a properly dignified way through the S.B.A.C. to the newspapers of the World.

For example, Mr. Montague told us about the R.A.F. experimental flights with flying-boats between Singapore and Calcutta, to test the possibility of flying in heavy monsoon rain. Although this work was done just about a year ago, it only leaked out through the *R.U.S.I. Journal* and THE AEROPLANE a few weeks ago. A proper account of the performance would have been enough to sell British flying-boats to every nation in the World which has a coast-line.

Also, there was a reference in the speech to rescue work done by flying-boats in the Middle East. And hardly anything has ever been published about this affair, which was a very good piece of work.

Then there was another reference to a flying-boat at Felixstowe which went out during that terrible December gale over the North Sea to look for missing fishing-boats so that big ships might go and rescue their crews. The bald statement is made that the flying-boat found more of them than any of the ships that went in search. But not a word of that ever appeared in the Press,—or if it did it was skilfully hidden.

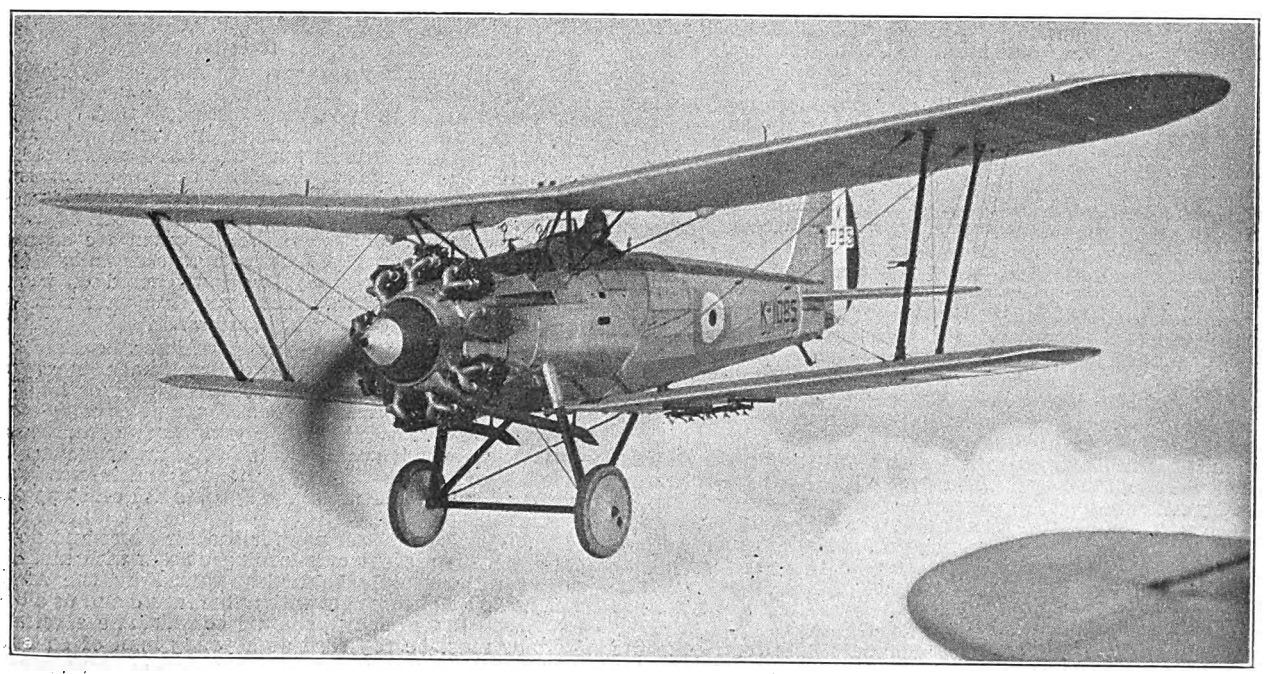
Also there was a reference to pacificatory work in the Sudan, of which nothing has been said in the Press. Really something ought to be done about this reticence in the Air Ministry. If ever a force deserved to be called the Silent Service it is the R.A.F.

TECHNICS.

A great deal of Mr. Montague's excellent speech was concerned with technical matters. In fact he has developed into quite a technical man, which may be because his tastes lie naturally in that direction or because his experience as a journalist in his murky past has given him a certain versatility in dealing with strange subjects.

"AND IN WILD HUNT, THROUGH MAZY TRACTS OF STARS, SWEEP IN THE SOUNDING STILLNESS OF THE NIGHT."

(MATTHEW ARNOLD—*Mycerinus*.)



HIGH DEFENCE.—A Bristol Bulldog (Jupiter supercharged engine), a single-seat fighter for defence against high-flying enemy aircraft.—("*Aeroplane*" *photograph*.)

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Naturally in these Parliamentary speeches a Minister is more or less the mouthpiece of his department. Therefore if one quarrels with some of his statements the quarrel is not with Mr. Montague, but with his officials.

For example, a statement in his speech that the Air Ministry has developed an instrument which indicates that there is a thousand times more noise in an air-liner than there is in an express train suggests that if his technicians would spend a little more time in thinking and a little less on fiddling with instruments we might get a bit forrader. Several aircraft in which one has travelled are much less noisy than our average tube train. And one is convinced that reducing the speed of airscrews by gearing does not decrease the noise in machines which are noisy, though it may make the screws more efficient. In fact a slow-running screw is quite apt to increase the vibration in a machine by giving a heavier thump every time a blade passes the leading edge of the plane, and fittings are likely to suffer in consequence.

Also Mr. Montague's officials seem to have been very slow in their study of interference effects between the different members of an aeroplane. Those who read Mr. R. J. Mitchell's excellent article in the last issue of The Aeroplane of 1929 may find much enlightenment on this point.

In the course of his speech, Mr. Montague gave a good deal of attention to wind-tunnels. One can only hope that his audience were intelligent enough to understand what he was telling them. There is a certain grim humour in finding all this official attention being directed towards high-pressure wind-tunnels to-day after having written so much about them oneself in The Aeroplane after a visit to the United States in 1924. One can only hope that our high-pressure tunnel will not catch fire spontaneously as did the American tunnel. At the same time it is sad to see Mr. Montague at this date holding up the United States as an example.

Another sad happening in his speech was his definite confirmation of the statement published some time ago that our Prime Minister Mr. Ramsay Macdonald has gone back on his enthusiastic declaration on the night of the Schneider Trophy victory that we would do our utmost to win the Trophy again if challenged. The only possible assumption is that Mr. Macdonald's personal enthusiasm could not overcome political expediency. One might apply to this decision a phrase which Mr. Montagu applied to an extremely pacifist speech later in the Debate, which he described as "More logical than reasonable,"—a phrase which deserves to become historic.

Civil Aviation.

On the subject of Civil Aviation Mr. Montague made several points of considerable interest. The new subsidy for Clubs would appear to be all right, if National Flying Services Ltd. proves that it can survive on the reduced rate of subsidy. More information on the Indian Government's blockade against flying across India by white men might have been given, but perhaps it would not have been expedient. And some statement on the possibility of our having a high-speed mail service without bothering about passengers would have indicated a progressive line of thought.

His defence of the Air Ministry's airship policy was good, especially the quite smart answer to critics that all passengers who attempted to cross the Atlantic in airships had arrived safely, some four hundred of them in fact.

Our Former Chief.

Sir Samuel Hoare's speech is reported later in this paper at rather greater length than the others because it was unusually sound, even for Sir Samuel Hoare who is notable for his sound and practical views on aviation. His arguments in favour of air force as an economy are unanswerable,—he would have been more than justified in using on this occasion his historic phrase "Control without occupation" to emphasise his arguments.

Nobody can fail to see the importance of his comparison of the expenditure on air armament by the other great Powers during the past few years. If we are going to have any kind of an agreement on armament of any kind we might well start with an agreement between the three other Powers which really matter and ourselves. Then we might be able to afford to develop commercial aviation in such a way that even without a great Air Force we might have strategic air-lines of high value.

Sir Samuel Hoare also did well in demanding a definite answer about how much or how little the Government really intends to do in connection with the next Schneider Trophy, if any. The result is that we now know that the Government is not even going to *lend* aircraft or engines and consequently, if we are challenged this year for a contest next year we now know that if private money will not put up the material for a British team we shall not have a team at all,—which is as it should be.

Another point on which Sir Samuel Hoare touched is the difficulties which the Italian Government have been raising against our aircraft flying over Italy. We now know that Italy has been cut off our air route altogether. The curious thing is that the new route is precisely that which has been advocated in The Aeroplane for years. Actually it will be more profitable to us in the end because there are far greater possibilities of our doing business with civil aircraft and to a certain extent with war machines in Austria and Jugoslavia than there is of doing business in Italy. Owing to the extraordinarily bad railway service in South-Eastern Europe there are openings for air transport such as do not exist anywhere else in our part of the World.

Yet another good point made by Sir Samuel Hoare concerned delays in Whitehall through the need for seven or eight different Departments having to co-operate when with air control over a certain area the air officer on the spot could act practically on his own initiative.

All And Sundry.

Mr. Mander of Wolverhampton had a good deal to say on the Club movement and while sympathising in every way with the Club movement, which The Aeroplane has probably done more to support than has any other publication, one does suggest that at the present stage of development the Government might very reasonably arrange to pay a subsidy only on those pilots who can pass as physically fit to join the R.A.F. in time of war,—and undertake to do so. Paying Club subsidies on women, old men, blind men, cripples and children is sheer waste of public money.

Rear Admiral Sueter, who ought to go down to History as the Father of Naval Aviation, had a good deal to say on the subject of aircraft versus battleships. Few are better entitled to speak on this subject, seeing that he and the late Lt. Col. Douglas Hyde-Thomson were responsible for the very first experiments in dropping torpedoes from aircraft. Also his suggestion that adequate breakwaters should be built for the protection of flying-boats at Malta and other strategic points is worthy of serious attention.

Mr. L'Estrange Malone, who only a few years ago was hob-nobbing with the Soviet Government in Moscow, now seems to have developed into a hard-shell Imperialist, agreeing even with Sir Samuel Hoare. In his speech Mr. Malone referred to Mr. Montague as a fellow prestidigitator. One confesses ignorance of Mr. Malone's skill as a conjuror, though his political career has demonstrated his quickness to execute a *volte face*, and though the quickness of the hand may deceive the eye it is sometimes not quite so astonishing as a change of face.

In his new part Mr. Malone said some very sensible things about the Indian air mail route, pointing out that other countries are getting in on the ground floor on the direct route to India in front of us,—notably the French and Netherlands Services who propose to go by way of Constantinople and Anatolia. He also drew attention to the American and French air line developments in South America. These services are naturally not undertakings which can be rightly subsidised like our Imperial Airways. But the fact that there is no British line competing with them is a distinct reflection on the common sense, let alone the patriotism, of the great British capitalistic concerns.

According to Mr. Malone America has 400 aircraft employed on regular air routes, Germany has 238, France has 345 and we have 23. These figures seem to be approximately accurate and provide food for thought.

Mr. Malone made a statement in his speech which if it is accurate discloses a curious lack of news-sense in most of our newspapers. He said quite distinctly that Sheik Feisal ed Dowish who, as was remarked in The Aeroplane some weeks ago, had fled from King Ibn Saud into Koweit, had surrendered to the British and had then been handed over to Ibn Saud's men, and that he had died on his way back to the headquarters of King Ibn Saud. Mr. Malone suggested that Feisal ed Dowish and his men are supposed to have been either Colonial Office agents or Indian Government agents and that they were butchered on their way back to their homes. This is distinctly a matter which ought to be cleared up by an official statement.

Captain Harold Balfour, who has been asking a good many questions in the House of late, made a very sound speech in favour of substituting air power for land power or sea power to a greater extent than is being done at present, and indicated how by saving money on the senior Services we could have a practically invincible Air Force. Also Capt. Balfour was both accurate and informative concerning the possibilities of flying-boats for coast patrol and protection.

His appeals for better pay for the Air Force and a general expansion to prevent over-loading officers with multifarious duties will certainly be highly valued by the Air Force itself. As a fighting pilot with a fine record and as a business man who has already achieved considerable success Capt. Balfour must be regarded as a young man of considerable promise

One of the few unintentionally comic speeches was de-

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livered by a Mr. Kinley from Bootle. Those who hold, according to the Shakespearan tag, that there is nothing in a name, must find difficulty in explaining why places like Wigan and Tooting and Bootle always raise a smile. The idea of the Member for Bootle playing the part of a kind of aerial Mrs. Partington and sweeping back the progress of aviation with pacifist speeches cannot be taken quite seriously. And yet, as Mr. Montague admitted, his arguments were quite logical even if they were not reasonable.

Our Former Under-Secretary.

Sir Philip Sassoon made one of the shortest and best speeches in the Debate. Apart from his businesslike comparison of our air strength with that of other nations, his suggestion for an Auxiliary Squadron of flying-boats is excellent and should be carefully considered by the Air Ministry. There are quite a lot of people with seafaring proclivities who also like flying and would certainly be glad to join such a squadron. And there are plenty of places along the South Coast where such a squadron could be housed and yet be accessible to members of the squadron living inland.

An interesting point raised by Sir Philip was the proposed vacation of the existing Air Ministry in Kingsway and the building of an adequate building in Whitehall where all the official people would be closely in touch with the War Office and the Admiralty. Apparently the rent that we now pay for the Air Ministry represents the interest on a capital sum of a million which would provide quite a nice building in that comparatively vacant space in Whitehall between No. 55 (where one's parental offices used to be in the dark ages) and the vicinity of Gwydyr House.

The main Debate was followed by a kind of Supplementary Debate on Civil Aviation in which Mr. Wells, the Member for Bedford, distinguished himself, and certainly earned his keep as an M.P., by a sound and practical speech on airships. Bedford, being close to Cardington, is very airship-minded, and quite naturally so.

Major Hills, who is generally very sensible in his outlook on affairs, again showed his common sense in wanting our Imperial air-way to go straight over Turkey to India. This in fact would be quite good policy. The Turks, although Republicans, are far from being Bolsheviks and they have a quite natural fear of invasion by Russia. Turkish relations with Russia are already distinctly strained, and the Turkish Government, who at various times in history have been valuable allies of Great Britain, seem to be turning very much in our direction at the present moment. Consequently a strategic air-line by way of Constantinople to Baghdad would not only be very useful to us but might be very consoling to our friends in Turkey.

Mr. Beckett of Peckham, a worthy running mate for Mr Kinley of Bootle, in the course of a conscientiously pacifist speech, produced one idea which certainly deserves attention, that is, that there are only two logical alternatives either to expand our Air Force till we have more fighting machines than other nations or "to chuck the competition altogether."

Quite a number of other people spoke, but the only other who seems to call for attention is Major Gwilym Lloyd George, very much the son of his father, who, with an eye fixed firmly on his constituents in West Wales devoted a whole speech to trying to find out whether the Air Ministry was going to provide work for everybody at Pembroke Dock by establishing an air base there. He cannot have got much satisfaction out of the reply that the Air Ministry had some idea of planting a squadron of seaplanes at Pembroke. Setting up such an establishment is hardly likely to provide the whole population of Pembroke with plunder, and apparently they have not the initiative to start up local industries and earn a living out of them.

With these remarks one commends the attention of readers to the condensed Debate.—C. G. G.

THE DEBATE ON THE AIR ESTIMATES.

The Debate on the Air Estimates in the House of Commons was held on Mar. 18.

The Under-Secretary of State for Air, Mr. F. Montague, said that the revised total of last year's Estimate, allowing for the Supplementary Estimate of £760,000, had been £16,960,000, so that Members would see that this year there was an increase in Air Estimates of £890,000, within a total of £17,850,000. This increase was due to the provision of the up-to-date equipment which was essential for safety and efficiency, the growing needs of Civil Aviation and additional outlay on scientific research work.

During the financial year ending Mar. 31, five additional squadrons would have been added to the establishment of the R.A.F. for the purposes of Home Defence. One of these was a regular Squadron and the other four had been organised on a cadre or auxiliary basis. Of the existing 38 squadrons primarily provided for Home Defence, 26 were regular squadrons and 12 were of the cadre or auxiliary type.

The reason for this preferential policy for non-regular units was that new regular squadrons could be formed more quickly. Non-regular units had to train their own personnel in flying and in ground duties, and they reached a high degree of efficiency if the pace was not forced. The all-round development of the Air Force called for a larger increase in the slower developing units during the earlier stages of the programme so as to ensure the due proportion of regular to non-regular units in the end. Auxiliary squadrons need not be equipped on the same scale as regular squadrons in their early days, but as they reached maturity they would have to be equipped with up-to-date Service aircraft.

British air policy was moderate and unprovocative. Our Air Force was substantially exceeded in terms of first-line strength by France, Italy and the United States of America and the new Estimates showed an actual reduction compared with those of five years ago. This was in striking contrast with very large increases in the air expenditure of the other Powers, despite the fact that our overseas requirements in the Middle East and India were very much greater than those of other countries.

Expansion would only take place so far as it was forced upon us by developments abroad. Home Defence was proceeding slowly, and quality was the aim rather than quantity.

Air Forces were being increasingly employed in substitution for

SUCCESSFUL CIVIL AVIATION.—The Gloster Survey (two Jupiters) and some privileged visitors at the popular Heston Air-Park, on Mar. 20, just before Mr. and Mrs. Alan Butler started for Africa. A Moth is to be seen getting off to the left, and the 300 foot Southall gasometer is in the background.
—("Aeroplane" photograph.)

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ground forces and thereby considerable economies had been effected and on a scale not yet attempted by any other nation. He quoted 'Iraq and Aden, in which latter place a squadron with 12 machines and 200 men had replaced for two years a total strength of about 1,600 combatants.

The prompt arrival of 50 soldiers by air had done much to prevent further serious riots during the disturbances in Palestine, but the main activities of the R.A.F. had been directed to keeping the authorities informed of any large movements of insurgents. Aircraft had also been able to drive off attacks by Arabs on isolated Jewish colonies before the arrival of ground reinforcements. Offensive action had been taken from the air 11 times and had, in many instances, saved otherwise defenceless communities, and there was no evidence of innocent persons having suffered.

Towards the end of last year the R.A.F. had dealt with two rebellious tribes, subjects of Ibn Saud, the King of Nejd, which had taken refuge in Koweit and in 'Iraq. Great Britain had undertaken to Ibn Saud that refuge would not be afforded to these rebels either in Koweit or 'Iraq. To implement that undertaking the local political officer ordered the refugees to withdraw across the frontier.

The refugees refused to go but they also rejected the alternative offered them that they should surrender unconditionally to the British authorities. This surrender had been the only alternative possible because of food and sanitary conditions, and the danger of complications which might have led to general fighting and loss of life. Eventually the High Commissioner of 'Iraq had authorised air action on a limited scale. The immediate result was the unconditional surrender of both tribes, some 7,000 people, to the Air Force. There were no casualties on either side.

Another instance was in the Sudan in December, 1929. A small section of the Nuba tribe in Kordofan had offered armed resistance to the police when arresting a tribesman for organising rebellion against the Government. The tribesmen held a strong natural position and a force of about 300 infantry had to be assembled to deal with them. The local Government decided to take air action in the first instance. After three days' bombing the position was occupied by the infantry without any casualties.

In the Aden Protectorate in September, 1929, a certain tribe had molested travellers and looted caravans from Dhala to Aden. Stoppage of tribal allowances failed to act, so the Sheiks were threatened with air action. Demonstrations were then made over the area, and warnings were dropped on villages. These proved effective and no air action was necessary.

He did not draw attention to this Air Force activity to give them undue prominence, but to show the prompt effectiveness and humaneness of the use of the air arm.

Of the "non-military" uses of the R.A.F. he could cite medical and surgical help in emergency, particularly in India; coastal rescue work in the Middle East; warnings and subsequent reconnoitring of flooded areas in the bursting of the Shyok Dam in India; survey, photography, and the anti-locust campaign in the Sudan; and at home, fishery protection against poaching by foreign fishing vessels on the East Coast. Excellent service had also been done by the R.A.F. at Felixstowe during the gale of December, 1929, when a flying-boat had co-operated in a search for overdue fishing craft. A long flight had been made in difficult weather and in a very high wind and a number of fishing vessels had been sighted,—the greatest number reported by any of the craft engaged in the search.

Referring to long-distance flights by the R.A.F. during 1929, Mr. Montague said that three machines of No. 45 Squadron had done a flight from Helwan to Nigeria and the Gold Coast and back, 8,400 miles. Four machines of No. 14 Squadron had flown from Egypt to the Cape and back and at the end of 11,200 miles had arrived at Cairo late by five minutes. Four long-distance flights had been made during the South-West monsoon by No. 205 Squadron, Singapore, to try-out the possibilities of a pre-arranged time-table between Calcutta and Singapore under adverse conditions.

Finally he wished to pay tribute to the two officers who, having successfully flown non-stop to Karachi, had lost their lives in an attempt to make a non-stop flight to Cape Town.

With regard to education in the R.A.F. an educational organisation had been built up which embraced not only the scientific side of the training of officers and skilled mechanics, but also a comprehensive system of further general education which was quite comparable with that in civil life. The training of aircraft apprentices could well bear comparison with that in civil engineering establishments. Close touch was kept with the local education authorities who were co-operating with the Air Ministry in satisfactory and increasing measure.

Officers for the specialist branches of technical work were trained within the Service but a policy had been adopted of using the Universities wherever possible for the advanced training in the higher theoretical aspects.

Coming to technical matters, he said that the problem of noise in aircraft was being actively investigated. Instruments which measured noise had shown that the intensity of the noise in the cabin of an air liner was 1,000 times as great as that in an express train. The chief sources of noises were the engine and the airscrew and it was considered almost certainly practicable to reduce the tip-speed of airscrews. Such reduction would conduce to greater efficiency and at the same time make a considerable difference to the resultant noise. Reducing the noise of engine exhausts by silencers had been studied with promising results. The National Physical Laboratory was co-operating with Imperial Airways and the Dutch Air Lines in acquiring data of the noise in aeroplane cabins and experiments had been made in sound transmission through the walls of the cabin.

Aerodynamic interference of one part of an aeroplane with another had also been closely investigated. The resistance of the fuselage and wings of an aircraft to the air flowing past them was in general greater when they were combined than the sum of their individual resistances separately, because each part set up a turbulence which interfered with the free flow of air round other parts. If aircraft had little more resistance than that caused by skin friction, calculations showed that probably only half of the power now necessary would be required for the same result.

The custom of testing models of ships in large tanks was being followed with aircraft except that a wind tunnel replaced the water channel, although for tests of seaplanes a water tank was also necessary. The present type of wind tunnel could only take quite small models and did not give an air speed much above the landing speed of a fast machine. Such low-speed tests gave a fair prediction of the performance of the full-scale aeroplane flying at ordinary angles, but when the stalling speed was approached the full-scale flow over the wings was no longer represented by the wind-tunnel tests, which then became actually misleading. Knowledge of the characteristics of an aeroplane near its stall was most needed to avoid dangerous spins or nose dives into the ground. Such tests had in the past been made by test-pilots flying test machines, a method which was slow, expensive, and dangerous.

The way out of the difficulty was to run the wind-tunnel with air made heavy by pumping it to 20 times its normal density. Then the air flow round the model behaved as it would on the full-sized aircraft. One such air tunnel already existed in the United States, and steps had been taken to build a compressed air tunnel at our National Physical Laboratory.

If the fullest possible reduction in money, cost, time and flying risks was to be made full-sized fuselages and airscrews would have to be tested under conditions approximating to actual flying. Judging by the experience of the United States aeronautical authorities a full-size tunnel would make possible remarkable advances in aeroplane efficiency. Provision had been made in the Estimates for the beginning of work on such a tunnel.

The outstanding achievement of the past year in engines had been the development of the Rolls-Royce "R" engine, which had been used in the Schneider Trophy winning aircraft. The two engines used had actually sustained an output of over 1,900 h.p. over the course. Advances were also continuing in the development of air-cooled engines. The advantage of the smaller frontal area of the water-cooled engine was being reduced in favour of the more simple air-cooled engine by the study of different types of cowling and the use of the Townend ring.

The result of the Schneider Trophy Contest had been a triumph which was shared by the technical staffs at the Air Ministry, the Royal Aircraft Establishment, the National Physical Laboratory, the personnel of the R.A.F. High Speed Flight and the British Aircraft Industry. The triumph had been increased a few days later when the Commanding Officer of the High Speed Flight had set up a World's Record of 357.7 m.p.h. upon a Supermarine Rolls-Royce aircraft.

The Government had since decided not to continue Government participation in the Contest, because an international sporting contest should not be carried on officially by military services. And doing so was now no longer justifiable, because of interference with the routine work of the R.A.F. Useful experience had been gained in the past, so official participation had been justified, but further progress could now be made with greater economy by other means. The Government hoped that the widespread public interest displayed would make it possible for the Royal Aero Club and the Aircraft Industry to organise future contests without Government assistance.

An experimental wireless rotating beacon for direction-finding was among many other items of research. The device was likely to be of value both for shipping and aircraft and the cost was being divided between the Board of Trade and the Air Ministry.

The increase in the Civil Aviation Vote was mainly caused by the provision for an additional subsidy in respect of the Imperial Air Service to South Africa. The existing service between England and India had now been extended to Delhi under arrangement with the Government of India.

Existing agreements with the light aeroplane clubs would end in the course of this year with two exceptions. The work they had done in promoting practical interest in flying had been excellent and after most sympathetic consideration of the possibility of giving them further financial assistance a conclusion had been come to that it would be equitable and justifiable to give them assistance on the same scale as that now given to National Flying Services Ltd.

Regarding the air service to South Africa the Union Government would make a substantial contribution towards the subsidy over a five years' period and would lend their support and co-operation generally. The other Administrations concerned, the Sudan, Kenya, Tanganyika, Uganda, Northern and Southern Rhodesia, had also undertaken to contribute and co-operate in a similar manner. A regular service between Alexandria and Tanganyika should begin in the Autumn of this year and the through service to Cape Town in the Spring of 1931.

The position of the projected service to Australia was that the Government of India had now extended the England—India service from Karachi to Delhi by means of aircraft chartered from and operated by Imperial Airways. The ground organisation across India was being vigorously pushed forward. The section to Calcutta would be ready by the end of March and by the Autumn enough progress should have been made to make possible operation to Rangoon. Proposals had also been submitted to the Air Ministry for the operation of the remaining section between Rangoon and Australia.

In explaining the present position of Airships, Mr. Montague said that the two airships now in existence had definitely disproved many of the gloomy forecasts ranging from minor defect to utter disaster. The meteorological investigations of the Indian route showed that conditions would generally be adverse on the return journey both between Karachi and Ismailia and between Ismailia and Cardington. Consequently a large reserve of fuel would have to be carried for the first experimental flight to the East of R.101. Having regard to a safety policy in a programme of this expensive character, the return flight to India would not be attempted in March or April. An extra bay would be inserted in R.101 during the Summer. This would increase her capacity by 500,000 cubic feet and give her an additional net lift of about nine tons. The suggestion that this additional bay provided for an unanticipated defect was not true.

The proposed programme for 1930 for R.100 consisted of flights to Montreal and back between May and September and between October and March scheduled flights between Cardington and Ismailia. For

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R.101 a flight to Karachi and back in September or October, then again to Karachi in December or January, after which there would be mooring trials and experimental flying from Karachi.

The minor alterations to R.101 should be completed by the end of April and certain flights might take place preliminary to the programme mentioned. Regularity was essential for commercial operation and before this stage was reached there must be a period of experimental flying on the Indian route to acquire operational and financial data as well as data for further technical developments. Also a mechanical means of transferring an airship from the mooring tower to the shed was desirable.

Sir Samuel Hoare, late Secretary of State for Air, said that he was particularly glad to hear the Under-Secretary of State for Air pay so generous a tribute to the activities of the Air Force overseas, and to the efficient and very humane manner in which they had worked in such places as 'Iraq, the Persian Gulf and the North-West Frontier of India.

He would like to add a further tribute to those that had been paid to the officers and men of the R.A.F. During the last 12 months the Air Force had suffered a very severe loss in the resignation of the man to whom the success of the Air Force was chiefly due—Lord Trenchard. There was no man who should receive greater credit for all those successes than the late Chief of the Air Staff, and he would venture to pay his tribute, which he was sure was shared by Members on all sides of the House, to the wise judgment, singleness of purpose, and strong and sympathetic character that, in all these eventful ten years, Lord Trenchard had devoted to the service of the Air Force and to British aviation generally.

With regard to Home Defence, was the policy of the Government to-day the same as that of the Socialist Government of 1924, namely the building up of a Home Defence Force of 52 Squadrons? At present only 38 of these squadrons were in being, last year 5 had been added and he would be happier if more than one squadron could be added this year. If the Under-Secretary wished to consolidate the existing squadrons and bring their equipment more up to date and put their establishments upon a firmer foundation he must accept that answer. If on the other hand it was a sign of a policy that repudiated the building up of the Home Defence Force the speaker would point out that the Government were undertaking a very heavy responsibility. After eight years' expansion we were only fifth in the list of air Powers and each of the other great air Powers of the World was at present engaged upon a programme of further expansion.

The present position of air disarmament was a very urgent and important question. He looked with the greatest anxiety at what appeared to be a new race of air armaments being developed between the great Powers of the World. The expenditure of France had risen by 113 per cent. during the last five years; the expenditure of Italy had risen 25 per cent.; and the expenditure of the United States had risen, 140 per cent.

In the course of the next few weeks the Preparatory Commission at Geneva would be resuming its sittings. What policy would the Government urge at Geneva? The mistake that had hitherto been made at Geneva was to complicate the problem with too great a number of technical details. His first warning to the Under-Secretary would be to keep clear of all the mass of technical details that some of the representatives at Geneva had heaped upon this problem during the last few years. His second suggestion would be to investigate the possibility of arriving at a parity agreement between the three great air Powers of Western Europe,—France, Italy and ourselves. Along that line we should prevent the risk of a race in air armaments growing up between three allies and friends and also an agreement of that kind would be the best basis for a more general agreement to be reached between all the Powers in the World in the League of Nations at Geneva.

He would like to know in greater detail the policy of the Government with reference to air records and particularly the Schneider Trophy contest. Would the Government, although they did not themselves enter, give assistance in other ways? Would some of the high speed machines that were now being built to Government order be lent to the entrants, or not? Although an Air Force unit would not be posted to undertake the race, would Air Force officers be allowed to act as pilots or as officers in the British team? He was afraid that unless assistance of this kind was given to the Aero Club and anyone else who could make an entry we should find that in the face of the Government competition of other countries that we should not be able to bear the expenditure or produce the crews or machines. He would be very sorry to see this race go by default in two years' time and some other country gain for its aviation and for its aircraft industry the prestige that had been gained for Great Britain during the last two years.

With regard to the projected development of the air route to India and Australia, he saw in the Press that difficulties had arisen about flying over the Italian section. He would like to know how it had come about that while France and Germany had already obtained flying facilities over Italy we had not.

Could the Under-Secretary give any information about the negotiations with the Commonwealth Government regarding the section between Singapore and Australia? The really important part of the service was the through route, the whole way from here to Australia.

Regarding the broader issue of the part air power could play in the system of Imperial Defence one prominent lesson had emerged from the last ten years of experience and that was that unless an almost intolerable burden of expenditure was to be put on the British taxpayer, air power must be used as a substitute for and not always as a supplement to other forms of defence. If for every one of our Imperial commitments there was to be added to the naval and military forces, a third service superimposed upon the other two, the result would be a burden of expenditure that the taxpayer would find almost impossible to pay.

Sir Samuel Hoare again quoted the economy exercised by the substitution of air control for the garrison in 'Iraq and Aden and referred to the successful air operations on the North-West Frontier of India and in the Sudan. He said that these experiences had been so uniform, so remarkable and so successful during the last 8 or 10 years that the time had come when the Government should consider carrying this programme of substitution further and should also consider whether there were other directions in our system of Imperial defence in which we could equally use the speed, the mobility and the effectiveness, of this new instrument, the aeroplane.

On the one hand we were faced with the growing burden of taxation and the need for economies, and on the other hand we were faced with the desire that we did not wish to be involved in long and protracted military operations in any part of the Empire if we could avoid it. By a further substitution of the air arm we had the means of making a real and substantial alteration in the whole system of Imperial Defence. The essence of air power was speed and it was no good having aeroplanes that could fly 150 miles an hour if delays occurred in coming to decisions in Whitehall which neutralised and destroyed the speed of that new instrument. In his own experience the quick application of air action had been delayed by the need of consulting seven or eight different Departments in Whitehall.

A soldier had once said of him that he must have been bitten by a mad aeroplane, but he suggested that an inquiry might be made by men less biassed than himself into the need for a greater unity of control at the seat of Government. He believed that such an inquiry would find that air power could be used on a greater scale in India; that the newer types of flying-boats could be usefully employed in some of the coastal defence work which was now undertaken by out-of-date sloops and coast defence craft; and that the development of civil air lines might play a very useful part in the organisation of our Imperial defence.

Every long-distance civil air route would be found of the greatest assistance in our system of maintaining law and order and keeping the *Pax Britannica* and would encourage the avocations of peace just as, in a similar way the building of the Razmak road upon the Afghan frontier had already encouraged trade and social intercourse and, as a result, had stabilised a difficult situation.

Mr. Mander (Liberal Member for Wolverhampton East) congratulated the Prime Minister on the contribution he had made to national air-mindedness by making journeys by air. He hoped that other ministers, particularly the Minister of Transport, would travel by air to show that it was safe as any other form of traffic and much quicker and more delightful.

After referring to the valuable work that had been done by the flying clubs he inquired whether clubs about to be formed would be entitled to participate in the new subsidies. He suggested that the pilots now being trained by the Government with a view to their joining the R.A.F. should be trained by the Clubs. [Presumably Mr. Mander means the pilots being trained in the Reserve Schools and in the Special Reserve and Auxiliary Squadrons.] He said that these young men were civilians and it would help the clubs and be more economic for the Government if they were trained by the clubs.

He then asked that compulsory powers should be granted to municipalities to purchase at a fair valuation land in the neighbourhood of their cities for aerodromes. He asked whether the Air Ministry were considering any experiments with night flying services from Croydon aerodrome similar to those made by other countries. He was not inclined to support airships until there had been a demonstration that they would carry even Members of Parliament. He would like to know what ideas the Air Ministry had about emergency landing places for airships.

He hoped that no military influence or hidden subsidy would turn Civil Aviation out of its true course. The safest and wisest way of overcoming the dangers and suspicions that arose from Civil Aviation was to have some international trust or cartel which would have control over all Civil Aviation in Europe.

He protested strongly against the view that the R.A.F. ought to be placed under the control of the Navy. The experience of the War had shown that it was fatal to allow a new Service with fresh ideals and a new future to be tied onto another Service which looked at it with a jealous eye and wanted to confine it and control it to do its own work from its own point of view.

He would like to pay a tribute to those gallant young men who were the flying officers of the R.A.F. Their work was of a far more arduous nature than that of their colleagues in the Army or the Navy because in peace time they were daily risking their lives on duties which required the greatest gallantry and endurance. Last year the R.A.F. had lost 42 lives. We had every reason to be proud of the officers and men of this great new Service. They had made us leaders of the World in speed records and he believed the House would do everything to support them by making ample provision in the Estimates.

Rear-Admiral Sueter (Conservative Member for Hertford) said that he did not think that the Secretary of State for Air had got a big enough share of the "loot." He had listened, on the previous day, to the Debate on the Navy, and had thought that most of the speeches had been covered with barnacles. From the time that Whitehead torpedoes had been dropped from a seaplane at Calshot a nail had been put in the coffin of the battleship.

An example of the value of the air arm in the service of humanity had been the evacuations from Kabul of 600 people without the loss of a single life. In 1840 we had lost 12,000 men in evacuating Kabul.

He suggested an Air Service Patrol of the Persian Gulf. [This has already been started.—Ed.] and a breakwater at Malta to protect flying-boats and make Malta a real airport. He hoped to see gunnery, torpedo and engineering specialists in the R.A.F.

He thought Farnborough got too much money. Last year they had produced a flow-meter and this year they were investigating the question of noise. Since the Armistice they had had £300,000 or £400,000 a year and they had not produced much for it.

He confessed to anxiety about the new bay in the R.101 and hoped that every calculation would be checked and cross-checked. He thought £500,000 was not nearly enough for the development of Civil Aviation. Had the Air Ministry done anything about the West Indies? A Conference in the West Indies some years ago had reported that they wanted an air service to British Guiana, a service from Guiana to Trinidad, a coastal service from Trinidad to Curaçao and a service from Trinidad to Barbadoes. They wanted £25,000 a year for that purpose.

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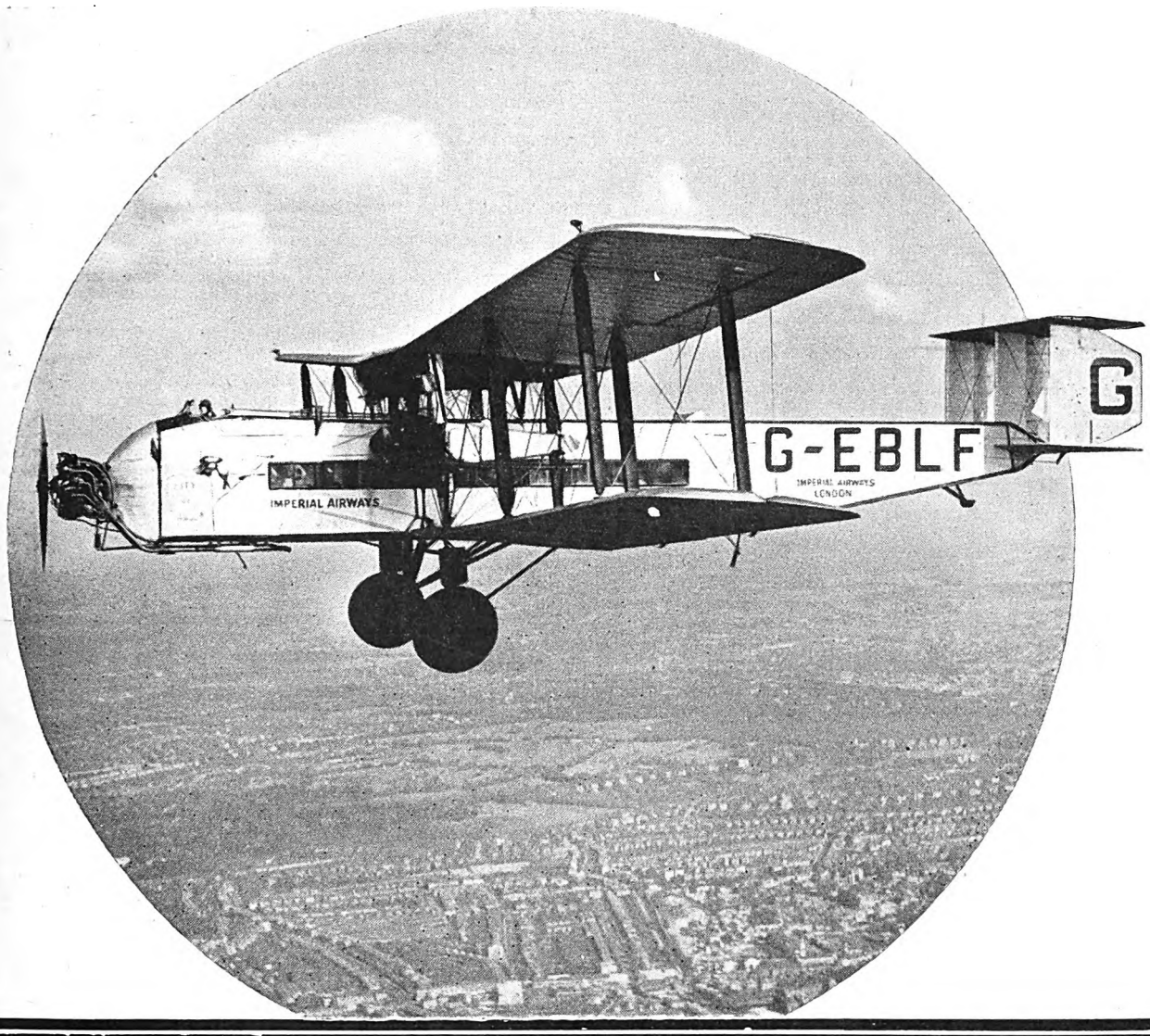

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He would like to associate himself with the tribute to Lord Trenchard. He could say from personal observation that no man had ever worked harder in building up the Air Force. One of the finest tributes given to the air service had been given by General Balbo, the Italian Under-Secretary of State for Air, when he had said: "A perfect Air Force which in skill and courage has given a unique example to the whole World." That was part of Lord Trenchard's work.

MR. L'ESTRANGE MALONE, late R.N. and R.A.F. (Labour Member for Northampton), congratulating Mr. Montague on his first estimates, paid him the doubtful compliment of saying that he knew he would handle the question skilfully because he knew of his prowess as a prestidigitator. He agreed that there was a lack of co-ordination in the amount of money to be divided between the three Fighting Services. A really scientific allocation of the money required for the three defence services would never be established without a Ministry of Defence. According to the latest figures France had 4,730 fighting aeroplanes compared with 1,292 in this country. If we were safe from air bombing by France with an air force of four-to-one strength against the British force, there was no need to stick out for a two-power standard at the Naval Conference. What research work was being done in the interests of the civil population who, in case of war, were going to play an equal part with those in the trenches?

The sums for the development of civil air routes seemed to have been prepared with a complete lack of imagination. Imperial Airways under the monopoly given them by the Government had certain powers which did not go towards the development of new air routes. They had concentrated on the India route, which was doing badly. There were insufficient machines and accidents had occurred. Very soon it would be possible to book by either a French or a Dutch route to India. These countries were getting in very efficiently on the one route on which we should have concentrated.

Practically the whole South American continent was now covered by the air transport companies of the United States with France and Germany taking second place and not a single company belonging to this country.

The Germans were going to run a route from Hamburg to Hull and across the British Isles to Galway; the French were going to cross the Atlantic to the South. There was an opportunity to develop flying off Atlantic liners, a reasonable and cautious step to shorten the trans-Atlantic passages.

The whole airship policy ought to be reviewed and we should consider whether we should cut our losses before more money was spent and more lives needlessly risked. Assuming that these two airships were a success and that they were capable of flying under any conditions, it must be perfectly clear that two airships were totally inadequate to maintain a regular service to any part of the World whatever. A service all over the World would require 10 or 20 airships and a capital of £10,000,000 or £20,000,000. A fraction of £10,000,000 spent on commercial civil aviation could produce regular routes to every part of the Empire because there was nothing experimental or problematic about the modern development of heavier-than-aircraft. Even the money devoted to airships this year would be sufficient to double the work that Imperial Airways was doing. The airships R.100 and R.101 were failures and could never be run on regular services. They were too slow to fight against an average wind and they could not carry a load which would make them a commercial proposition. The money spent on these airships had been poured down the sink and the only thing to do with them was to hand them over to the Admiralty in return for one or two cruisers.

Finally he suggested that the Government should appoint a Committee to review the airship policy of the country in the light of the experience of the last five years and the present stage of airship development and also of the progress made by heavier-than-aircraft, whether further expenditure on airships was justified.

CAPTAIN HAROLD BALFOUR, M.C., late R.F.C. and R.A.F. (Conservative Member for Thanet), was disappointed that the Government had not seized the opportunity of a bold policy of substitution. The great chance of some Government would come when they were determined to hack through the traditions and vested interests of the older Services and recognise that the Air was the power which could command in the future.

Those Members who had served in the Navy claimed that the Navy was the only possible means of defending our food lines and that cruisers were essential. The flying-boat would encroach on even this preserve in the future. A great field for economy lay in the abolition of the capital ship in view of its obsolesence by virtue of the development of aircraft. Captain Balfour quoted from the results of practical demonstrations of aircraft against ships and went on to say that in the cases of 'Iraq, Aden, Palestine and Syria, air control had proved itself efficient, humane and more economical than the older forms of defence.

The present policy of the Government produced three semi-crippled forces instead of one efficient Air Force and two other efficient forces with their responsibilities transferred to the newer arm. Year after year the Air Minister or Under-Secretary would come down to the House and say with pride that the Air Force had extended its activities and was doing more work, and was spending less money. The expense of this was the danger of overloading the junior ranks of the R.A.F. beyond their capacity. There were no great rewards and a good deal of risk in the Services. Even with the new promotion scheme there were many hard cases.

Captain Balfour also objected to the system which left to Imperial Airways the responsibility of performing Imperial duties together with that of performing their duties to their shareholders. The system prevented competition and did away with the need for the most modern equipment. He also wanted subsidies for new flying clubs. He wanted to see the Government support the aircraft industry by sending machines to the opening of municipal aerodromes and on another long-distance cruise. He suggested that an aircraft carrier of the R.N. with types of aircraft on board produced by this country should be sent to the Buenos Aires Exhibition in 1931. He hoped the Air Ministry would lend pilots for the Schneider Trophy race and that they would lend them as pilots on duty.

MR. KINLEY (Labour Member for Bootle) advocated the abolition of the R.A.F. because of the damage that could be done to one country by another for a very small outlay.

SIR PHILIP SASSOON (Under-Secretary of State for Air in the last Government) said that lest anyone should think that the increase of £890,000 in the net Estimate for this year was inconsistent with our national policy of promoting international peace and disarmament it would not be out of place to compare our net figure of under £18,000,000 for the Air Estimates this year with the Air Estimates of the United States of America. That great country with its nearest air rivals many thousands of miles away was preparing to spend in the coming year £33,000,000 upon its Air Estimates.

Without being prejudiced by personal considerations he would like to have seen one or two more auxiliary squadrons included in the Estimates. They were a valuable addition to the air defences of the country.

There was no end in sight to the use of flying-boats in developing the civil and military communications of the Empire. They preserved the nautical tradition of the British race and he suggested making use of this national instinct by forming an auxiliary squadron of flying-boats at Southampton or some other convenient place.

He spoke of the Oxford and Cambridge Squadrons and asked for a Squadron for the University of London on similar lines.

He claimed that the inefficiency and expense of the present arrangement of housing the Air Ministry in several different buildings was becoming notorious and asked for a new Air Ministry in Whitehall. The rents of Air Ministry premises were £48,000 a year, which represented the interest on £1,000,000.

He appealed for a working solution to the problem of the short service officer at the end of his term of service.

MR. MONTAGUE replying to the previous speakers said that the programme of home defence at the present time did represent a policy of consolidation and efficiency. The Government policy with regard to air disarmament was one of sympathy and support of all that could be done on reasonable lines to secure common action in this direction between the nations of the world.

With regard to the Schneider Trophy there would be no Government assistance given in the form of lending aeroplanes or officers. Technical advice and every other kind of assistance possible would be given.

He appreciated the possibilities of effective substitution of the air arm for other arms in various parts of the world and the subject was at present before the Cabinet.

Negociations were still going on between the Government and the Italian Government on the possibility of an air route by Naples and Corfu. The route between London and Egypt through Italy had now been diverted and, subject to the necessary provisions being granted by the countries concerned, would continue by Cologne, Belgrade and Salonika. It was about 100 miles shorter and during the present season some part of it had to be done by train.

Any light aeroplane club which conformed to the conditions of membership and otherwise of existing subsidised clubs was at liberty to apply for official recognition as an approved club, and if so approved would be eligible for payment in respect of its members under the new arrangement as from April 1 next.

A sum of £6,250 had been included in the Estimates for the provision of portable floodlights at five aerodromes in the Middle East and the Persian Gulf to enable flights at night to be regularly undertaken on the India route which would mean a considerable reduction in the time taken to travel by aeroplane to India.

The comparative figures of first line machines for the five Powers were approximately Great Britain 770, United States 900, France 1,300, Italy 1,100, Japan 500.

The research work at Farnborough during the last nine months had included fuel for airship engines, and the slot and aileron control.

The Air Ministry thoroughly realised the disadvantage of leaving the West Indies to the penetration of other countries and were trying to find ways to encourage British aviation in the West Indies. Inter-Colonial development of aviation must depend upon the sympathy and interest of the Colonies concerned, and that interest and sympathy was best shown by their willingness to consider the financial question in conjunction with the Imperial Government.

He repudiated the suggestion that the reason for the accidents upon the Indian air route had been any lack of efficiency or lack in number of aeroplanes or pilots on the part of Imperial Airways.

He admitted that at the present stage it was impossible to think of airships from the standpoint of commercial profit, but there was plenty of evidence of the future value of airships. Airships were able to make isolated flights with loads over distances which had not been approached by aeroplanes. Of the approximately 429 persons who had crossed the Atlantic by air, only 25 had travelled by aeroplane and every airship passenger had arrived in safety. The airship could remain in the air irrespective of engines so that ordinary running repairs could be made while flying, and there was adequate room for making observations and proper chart tables and navigating instruments could be carried.

Imperial Airways monopoly was only a monopoly of subsidies. Any commercial firm could undertake commercial flying. The policy of leaving competition to fight it out had been tried and had failed. He thought that there was every prospect of Government subsidies not being needed in the course of a few years.

He would take note of the possibility of a Squadron for the University of London.

The speech of the Hon. Member for Bootle had been more logical than reasonable. Disarmament by progressive inefficiency was, of all ways, the most impossible and unreasonable.

THE CIVIL AVIATION AMENDMENT.

MR. GEORGE OLIVER (Labour Member for Ilkeston) moved

"That this House welcomes the development of civil air transport both as a means of peaceful inter-communication and a bond of

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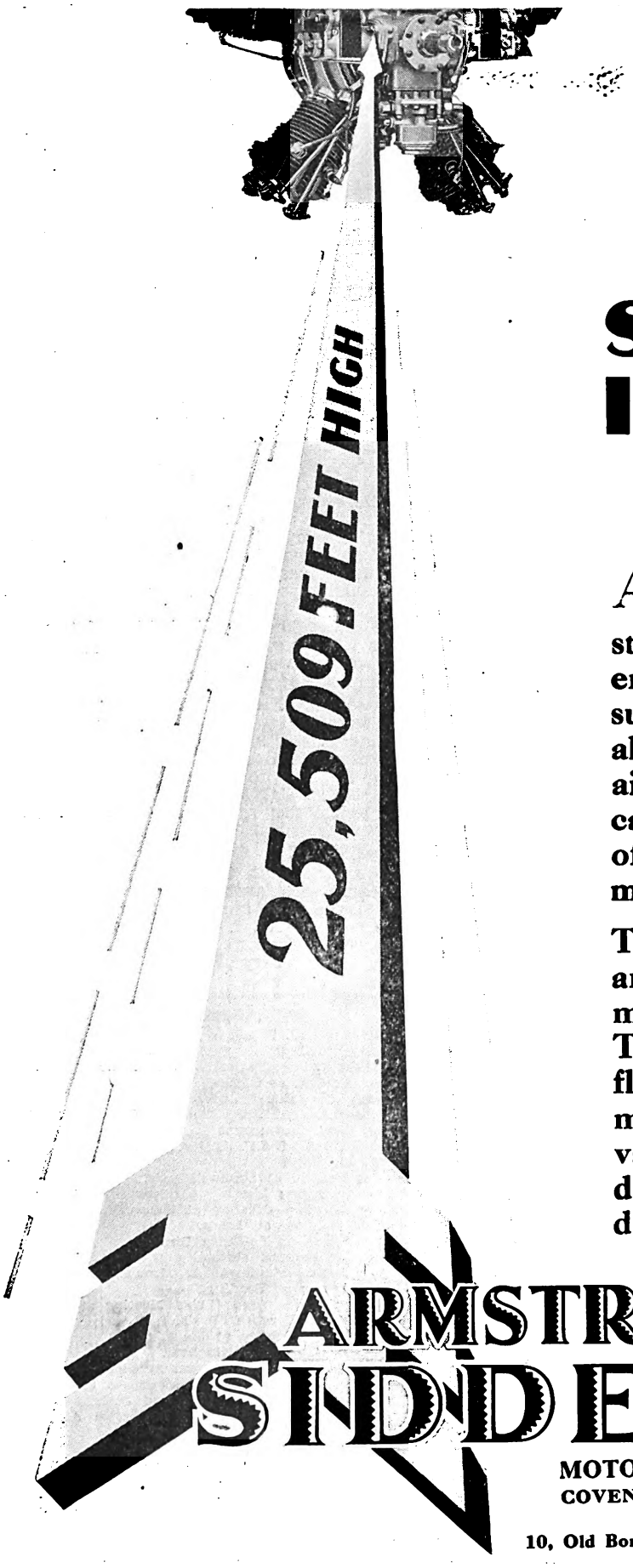

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common interest between nations in general, and more particularly as affording a further unifying link for the British Commonwealth of Nations; and desires that this country should take its appropriate share in aiding and fostering such development."

Mr. Oliver asked for legislation to confer compulsory powers upon local authorities for the acquisition of land for air ports. He thought our commercial air mileage and the number of our commercial aerodromes compared unfavourably with those of other countries. In view of the fact that every aeroplane built employed men in something like 40 industries he was sure that the nation would be pleased to spend considerably more than £500,000 in subsidies to civil aviation.

Mr. Palmer (Labour Member for Greenwich), seconding the Amendment, said that Civil Aviation called for imagination, for rapid development and for the expenditure of money. He asked for a clear cut between the fighting side and the civil side of this service and hoped that the one would be developed to its fullest extent even at the expense of the other.

Major Hills (Conservative Member for Ripon) said that the more you brought forward commercial flying the further off you put war. In flying to Sweden recently he had flown over six countries all of which had looked alike from the air. A bare comparison of mileage did not mean anything. One route might be flown four or five times a day. Some aeroplanes would only carry one or two passengers while others would carry 20. We did the most work with the fewest aeroplanes. No large-sized aeroplane, no aeroplane except a very small Moth, flew without a subsidy. We had the safest and the most reliable flying service in the World and we were the only country that looked to civil flying paying its own way.

He was rather alarmed about the route to India. India should be treated as a proposition by itself and the flights made straight by Constantinople to Baghdad. The Egyptian route should be a separate thing.

He was not impressed with the safety of air ships. It was a pretty drastic criticism of the design if you had to cut the airship in two and give it a new waist.

He protested against the high insurance of civil aeroplanes.

Mr. S. R. Wells (Conservative Member for Bedford) made a long speech in appreciation of airships. He referred to the airship programme of the U.S.A., to the success of the *Graf Zeppelin* and to the achievements of the two British airships. He asked that petrol should not be used in airships and that mooring masts should have international standardised fittings.

Mr. Montague said that Atlantic Airways Ltd. had been formed to develop air services in the West Indies. There were Government representatives on the Board of Imperial Airways and the Government had a financial interest in the Company.

Lord Trenchard's scheme initiated some three years ago under which boys from public schools were selected by the Air Ministry as suitable for short service commissions and were taken into the employment of large firms, served a preliminary period with the firm, became officers for five years, and then returned to employment with the firm, was the reply to the question of what consideration the Air Ministry was giving to the future of these officers. The firms interesting themselves included Dunlops, General Electric, Metropolitan Vickers, Humber, British Thomson-Houston, and J. and G. Weir.

The mechanical handling of airships would probably be solved by the use of some form of stub masts similar to the existing American system.

Commander Bellairs (Conservative Member for Maidstone), after advocating the use of obsolete warships as bases for mobile mooring masts, claimed that Civil Aviation was hampered by military requirements. He said that all lines, clubs, aerodromes and companies depended upon the nod of the militarists and had become parasitic. He brought up the old fallacy that we are behind other countries in Civil Aviation.

Mr. J. Beckett (Labour Member for Peckham) moved to reduce the Air Force Vote by 30,000 men, made a long speech calling for the abolition of the Air Force, in which he said that however much money was spent, however many aeroplanes were built, there was no safety and no hope in building up armaments of this kind. In the circumstances there were only two logical alternatives, either to expand our Air Force until we had more fighting aeroplanes than any other country or to chuck the competition altogether.

Major Gwilym Lloyd George (Liberal Member for Pembroke) asked the Air Ministry to get on with the Pembroke Air Base while employment was wanted, and pointed out that there was no provision for it in the Estimates.

Major A. J. Muirhead (Conservative Member for Wells) made a longish speech about co-ordination of Defence Services and was rebuked several times by the Chairman for going wide of the subject.

Mr. E. Scrymgeour (Independent Member for Dundee) talked a lot about brotherly love among the nations and was also frequently rebuked by the Chairman from getting away from the point.

Mr. Montague said that the Pembroke Dock would be used primarily as a station for a flying-boat squadron and possibly for one or two minor units as well.

He said "The only organisation of avowed Socialists who stand for the abolition of the British Army, Air Force and Navy, but not the abolition of Russian or of any other military forces, was the Communist party." The recognised bodies of organised Socialism and Labour in the country did not accept the policy of abolition.

Mr. C. J. Simmons (Labour Member for Erdington) said that he and many others had fought during the War 1914-18 for the principle of pacifism, to make Air Forces unnecessary. He belived a disarmed nation would be safest in time of war.

The Committee divided—Ayes 22, Noes 226.

A QUESTION IN ANOTHER PLACE.

Marshal of the R.A.F. Lord Trenchard has given notice that he will ask the Government, in the House of Lords, on April 9, for a statement of their air policy, "having regard to the importance of an adequate and efficient air force."

THE BUENOS AIRES EXHIBITION.

In the House of Commons on March 20, in reply to a question by Mr. D. G. Somerville, the Under Secretary of State for Air said that his attention had been drawn to the suggestion that one of the Fleet Aircraft-carriers should be sent to the Empire Exhibition at Buenos Aires next year to stimulate the sale of British aircraft in South America. The object in view was one which he fully endorsed. The matter was under consideration, but Fleet and training requirements and the heavy expenditure on fuel which would be involved presented very real difficulties.

THE GERM OF AN IDEA.

The following letter in *The Times* of Mar. 19 contains the germ of an idea, of which the Germans made full use, so far as their material allowed, at Jutland, the idea of naval co-operation with airships:—

We are all seeking an answer to the riddle why 50 cruisers are now considered by the Government to be adequate for the British Empire, while a short while ago 70 were stated to be the minimum. May not the answer be found in the success of the two new airships, R.100 and R.101, in their trials so far? Fifty cruisers plus 20 airships to co-operate with them would certainly be of equal value to 70 cruisers without airship assistance, and, as an airship is much cheaper to build than a cruiser, the Government may be well justified in holding their hand as regards cruiser construction till they learn how the airships perform on long-distance cruises, about which we should have full data in a few months.—Captain F. L. M. Boothby, R.N. (retired), Woodvale, Cowes, I.W.

The writer has neglected certain aspects, however. R.100 and R.101 were designed purely for commercial purposes, and their designers have frequently denied any military intention in their conception. Of course, airships of such size are vulnerable to gun-fire. For such naval co-operation high-flying airships would be necessary, and to protect themselves these airships would have to carry single-seat fighters which could be released to meet attacking aircraft. The new American airships are to carry aeroplanes for this purpose.

The French are building small airships of two types for naval co-operation, the smaller of the two types is designed especially for convoy work.

FLYING WITHOUT NAVIGATION LIGHTS.

Airmen are warned that aircraft will be flying at night over an area bounded by Bromley—Dartford—Gravesend—Rochester—Maidstone—Tonbridge—Oxted—Warlingham—Bromley, between 20.30 hours and 23.59 hours, during the period from April 1, 1930, to May 17, 1930. The aircraft will not exhibit navigation lights whilst flying at an altitude of over 6,000 ft., unless they see other aircraft flying in their immediate vicinity.

THE EFFECT OF PROPAGANDA.

The Times reports that the Chilean Air Service has ordered 40 military aeroplanes in the United States.

This seems all the more lamentable when one recalls the pioneering work of Lt.-Col. J. L. Travers, Major Scott, and others, in special missions to Chile, who did so much towards making that country realise the possibilities of aircraft generally.

IMPORTANT DATES.

Mar. 29.—Assoc. Football, R.A.F. v. R.N. and R.M. at Milwall.
April 2.—Assoc. Football, R.A.F. Senior Cup Final.
April 3.—M. M. P. Grimault's lecture before the R.Ae.S.
April 5.—N.F.S. Meeting at Reading.
April 5.—W.R.A.F. Re-Union Dinner.
April 6.—The third Ashwell-Cooke Challenge Competition at Lympne.
April 9.—Hockey Unit Tournament Final.
April 9.—Assoc. Football, R.A.F. Junior Cup Final.
April 12.—N.F.S. Meeting at Hull.
April 17.—Spring Session at Cranwell ends.
April 19.—Leicester Flying Meeting (Leicestershire Aero Club).
April 21, Easter Monday.—Meeting at Hanworth.
April 26.—N.F.S. Meeting at Leeds.
April 26.—No. 45 Squadron Re-Union Dinner.
May 31.—Bristol Air Pageant (Bristol and Wessex Aeroplane Club). Official opening of Bristol Municipal Aerodrome.
June 7.—N.F.S. Meeting at Reading.
June 9.—Northamptonshire Aero Club's Meeting at Sywell.
June 10—15.—F.A.I. Conference, Paris.
June 14.—R.A.F. Garden Party at Manston.
June 15.—N.F.S. Meeting at Nottingham.
June 21.—Annual Air Rallye at Haldon Aerodrome.
June 21.—Competition for the Gwynn Maddocks Cup at Heston.
June 26.—Ipswich Air Pageant (Suffolk and Eastern Counties Aeroplane Club). Official opening of Ipswich Municipal Aerodrome.
June 27.—Annual Dinner, R.A.F. Dinner Club.
June 28.—Royal Air Force Display at Hendon.
July 5.—King's Cup Air Race (Royal Aero Club—Heston Air Park).
July 13.—N.F.S. Meeting at Leeds.
July 19.—N.F.S. Meeting at Hull.
July 20—Aug. 7.—International Touring Competition.
July 26.—Norwich Flying Meeting (Norfolk and Norwich Aero Club).
Sept. 1—6.—International Congress on Air Navigation at The Hague.
Sept. 6—28.—International Aero Exhibition at Stockholm.
Sept. 20.—Liverpool Air Pageant (Liverpool and District Aero Club and Lancashire Aero Club).
Sept. 27.—Air Pageant at Hanworth.
Nov. 28—Dec. 14.—International Aero Exhibition at Paris.

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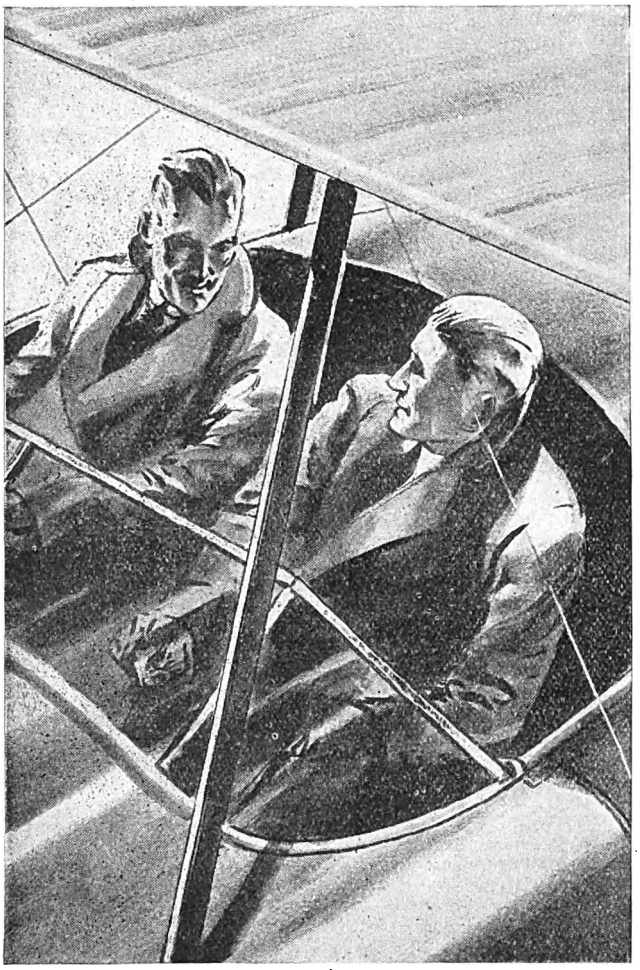

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FIRST KARACHI to ENGLAND FLIGHT by an Indian Airman

Mr. R. N. Chawla is the first Indian pilot to fly from his native country to England.

He left Karachi on February 18th, in a "Gypsy" Moth and reached Croydon on March 21st. Throughout the flight he used "Golden Shell" oil and "Shell" petrol exclusively.

GOLDEN SHELL OIL AND SHELL PETROL

SEALED SHELL

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THE AIR SURVEYORS.—Mrs. and Mr. Alan Butler just before starting for Croydon on Mar. 20,—A truly feminine touch is given by the bag under Mrs Butler's arm.

THE SURVEYORS SET FORTH.

On March 20 at 12.15 hrs. the Gloster Survey machine (two 465 h.p. geared Jupiters) left Heston for Cape Town with Mr. and Mrs. A. S. Butler as pilots and Mr. Millyard as engineer. They reached Cologne the same afternoon and arrived at Vienna on March 21.

The machine after flying across Europe to Salonika and down the coast of Greece and across the Mediterranean to Sollum will follow the orthodox route to the Cape, whence Mr. and Mrs. Butler will take ship to Rio de Janeiro. The Survey machine will then be flown back to the headquarters of the Aircraft Operating Co. Ltd. at Bulawayo.

There was a bitter N.W. wind blowing at Heston all the morning of the departure and maybe this was the reason for the survey machine's rapid passage from Gloucester to Heston.—Mr. Saint left Brockworth at 05.50 hrs., and arrived at 06.25 hrs. at Heston. On the other hand Flight Lieutenant Saint may not have been hurrying as much to get out of the cold as to eat the breakfast he knew they had waiting for him. People were breakfasting at Heston before 08.00 hrs. on this occasion,—imagine a railway station at that hour.

Although there was a large collection of cameras and cinema machines to click their parting shots, this departure was outstanding because it illustrated the way in which the aeroplane has become accepted as *the* transport vehicle. The machine though a particularly good one, and the finest of its type, was not the centre of attraction any more than a well-known privately owned yacht is, when she takes her owner for a honeymoon or world tour.

This was a social show. Mr. and Mrs. Alan Butler were going to the Cape. Naturally a lot of their friends, coming to wish them goodbye, flew over to do it.

Flying seems the easiest way to go to the Cape or similar distances now. A man and his wife together with an engineer can set out quite sure of reaching their destination. This seems a simpler way than going by train and boat with the complicated fuss of embarking or debarking, training and detraining.

There is another comparison which may perhaps indicate a new trend of industry. Here we have the chairman of an aircraft constructing firm and of an aerial survey company acting as his own pilot and navigator on a business journey. One wonders whether a similar event has ever happened in the other forms of transport.—T. J.

Mr. and Mrs. Butler reached Athens on the evening of Mar. 23.

TO AUSTRALIA IN LUXURY.

On Mar. 24 Flg. Offs. H. L. Piper and C. Kay landed at Port Darwin, Northern Territory, Australia, in their Desoutter Cabin Monoplane (Cirrus-Hermes engine). They left Croydon on Feb. 9, and as reported in The Aeroplane for Feb. 26 reached Akyab on Feb. 24, after which no further news arrived till they reached Darwin.

The Desoutter Aircraft Co. Ltd. have received a cable saying:—

Aircraft wonderful under all conditions.—Piper.

This is the first cabin aeroplane (light or heavy) to fly to Australia. It was a standard production machine taken from stock, and was only modified by the addition of an extra petrol tank and by streamlining certain exposed fittings.

The Desoutter started from Croydon loaded to 2,000 lbs. instead of the normal 1,800 lbs. In spite of this a cruising speed of 102 m.p.h. was obtained. This successful flight adds another feat to the long record of big flights made in aircraft with Cirrus engines.

The preparation of maps, route-information and ground organisation for the flight was entrusted by Flg. Offs. Piper and Kay to the Service Department of N.F.S. Ltd., who are the sole concessionnaires for the Desoutter Cabin Monoplane in Great Britain.

The arrival of the Desoutter and its crew in Australia is another demonstration of the excellence of British standard aircraft and engines.

A NEW IRVING PARACHUTE.

The Irving Air Chute of Gt. Britain Ltd. has produced a new type of parachute, called a Quick Connector. It is designed specially for passenger aircraft. The pack is a complete unit, separate from the harness, so that it can be discarded when flying and hung in a convenient position in the cabin or cockpit, much like a ship's lifebelt in a cabin.

In an emergency it is taken down and hooked onto the harness in front at two points. The action merely consists of pressing or jerking the two links on the pack against the two hooks on the harness.

Should only one attachment be made in the excitement of the moment the parachute will function just as efficiently, as the strength of one connection is more than equal to the shock load.

This Quick Connector type can also be recommended for aerial photographers who do not want to be impeded with a parachute pack while at work. The release ring is fitted in a pocket on the pack itself.

In the passenger cockpit of light aeroplanes the Quick Connector will not only fit neatly into the shelf beneath the cowling but can be worn by the aviator quite comfortably while flying.

THE DISASTER AT OCEANSIDE.

On Jan. 19 a Ford Trimotor which belonged to the Maddux Transcontinental Air Transport Line crashed at Oceanside, California. The fourteen passengers and two pilots were all killed.

The machine was returning to Los Angeles from a race meeting at Agua Caliente, Mexico. Reports say that either fog or engine trouble forced a landing and the pilot misjudged his distance. The machine ploughed a considerable distance across a field and then caught fire.

[Here one would venture to raise a point of importance. In machines of this type the fuel is in tanks in the centre-section of the wings. There is direct access to these tanks from the cabin. One therefore believes that in such a crash the fuel is likely to pour into the cabin. Could not the tanks be placed in the wings outboard of the cabin so that the fuel has some chance of soaking into the ground and not filling the cabin?—T. J.]

AN AIR ROUTE TO THE IRISH FREE STATE.

In the House of Commons on Mar. 12, in reply to Colonel Howard-Bury, the Under-Secretary of State for Air said that he was fully in sympathy with the need for the establishment of an air service between London and the Irish Free State, but circumstances did not appear to justify any representations at the present time to His Majesty's Government in the Irish Free State. The establishment of an air service between London and the Irish Free State would naturally be a matter of private enterprise, and any discussion between the two Governments, to be practical, should have reference to concrete proposals which have been put forward. No such proposals had been received by the Air Ministry.

NEARLY THERE.

The Times reports that Mr. Van Lear Black arrived at Hong Kong from Hanoi, French Indo-China, on Mar. 19 on his latest long-distance flight, from England to Japan.

A FOREIGNER CLEARS CUSTOMS AT HESTON.

On Mar. 13 Herr Kopp, a German private owner, with two passengers, landed at Heston in a Klemm monoplane (40 h.p. Salmson engine). This was a notable occasion, for Herr Kopp's was the first foreign aircraft to clear Customs at Heston Air-Park and three people is a lot for 40 h.p.

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THE ROYAL AIR FORCE.

The London Gazette.

Air Ministry, March 18.

ROYAL AIR FORCE.

Group Capt. H. Cooper, D.S.O., M.R.C.S., L.R.C.P., is appointed an Hon. Surgeon to the King (Mar. 6).

Air Vice-Marshal D. Munro, C.B., C.I.E., M.B., Ch.B., F.R.C.S. (E), relinquishes his appointment as Hon. Surgeon to the King on retirement from the Royal Air Force (Mar. 1).

GENERAL DUTIES BRANCH.—The following are granted perm. comns. as Plt. Offs. with effect from Mar. 8 and with seniority of the dates stated:—G. D. Emms (Sept. 8, 1928); L. A. Hutchings (Mar. 8, 1929). J Constable-Roberts is granted a S.S. comn. as a Flg. Off. with effect from and with seniority of Mar. 3. The following Plt. Offs. on probation are confirmed in rank:—R. I. Johnson (Mar. 1); A. C. P. Westhorpe (Mar. 15).

The following Plt. Offs. are promoted to the rank of Flg. Off.:—G. N. E. Tindal-Carill-Worsley, J. J. Owen (Jan. 28); D. A. Craik, E. B. Grace (Feb. 24).

Flt. Lt. S. Nixon, O.B.E., is seconded for duty as Assistant Director (Organisation), Royal Airship Works, Cardington (Jan. 1).

The following Flg. Officers are transferred to the Reserve, Class A (Mar. 14):—J. H. Barringer, S. C. Parker. The following Flg. Offs. relinquish their S.S. comns. on transfer to the Indian Army (Feb. 25):—C. J. Veevers, W. R. J. Spittle. The following Flg. Offs. relinquish their S.S. comns. on account of ill-health:—P. G. S. Gardiner (Mar. 12); C. Heard-White (Mar. 14); J. W. M. Nancarrow (Mar. 14).

The following Flt. Lts. relinquish their S.S. comns. on completion of service (Mar. 15):—A. R. Prendergast, V. J. Somerset-Thomas, H. G. Kirkman, R. Stiven.

ACCOUNTANT BRANCH.—Flt. Lt. H. J. Gilbert is placed on the retired list (Mar. 14).

MEDICAL BRANCH.—Flt. Lt. J. F. McGovern, M.B., B.Ch., is granted a perm. comn. in this rank (Mar. 19).

RESERVE OF AIR FORCE OFFICERS.

GENERAL DUTIES BRANCH.—The following Plt. Offs. on probation are confirmed in rank:—G. S. Ogilvie (Mar. 9); T. B. Cooper (Mar. 14); G. A. G. Bowden (Mar. 18). The following relinquish their comns. on completion of service:—Flg. Off. L. W. Thres (June 24, 1929); Flg. Off. G. R. Burge (Feb. 10); Flg. Off. W. J. Walsh (Feb. 26); Plt. Off. E. F. S. Hughes (Jan. 27).

Flg. Off. P. B. Clews relinquishes his comn. on account of ill-health and is permitted to retain his rank (Mar. 19); Flg. Off. J. Constable-Roberts relinquishes his comn. on appointment to a S.S. comn. in the R.A.F. (Mar. 3).

AUXILIARY AIR FORCE.

GENERAL DUTIES BRANCH.—No. 601 (COUNTY OF LONDON) (BOMBER) SQUADRON.—The following Plt. Off. to be Hon. Flg. Off.:—P. Du Cane (Mar. 6). No. 603 (CITY OF EDINBURGH) (BOMBER) SQUADRON.—The following Plt. Offs. to be Flg. Offs.:—M. H. G. White (Dec. 25, 1929); J. E. Glenny (Jan. 11).

Appointments.

Week ending March 25.

GENERAL DUTIES BRANCH.—Wing Commanders J. C. Russell, D.S.O., to H.Q., R.A.F., Transjordan and Palestine, for duty as Station Commandant, Amman, 7/3. J. K. Wells, A.F.C., to R.A.F. Practice Camp, Catfoss, to Command, 8/3.

Squadron Leaders T. E. Salt, A.F.C., to R.A.F. Depot, Uxbridge, 8/2. G. H. Martingell, A.F.C., to No. 15 Sqdn., Martlesham Heath, 1/3. F. W. Trott, M.C., to No. 27 Sqdn., India, 7/3. L. O. Brown, D.S.C., A.F.C., to No. 20 Sqdn., India, 7/3. G. B. A. Baker, M.C., to H.Q., R.A.F., Transjordan and Palestine, 25/2. D. W. Clappen, to No. 70 Sqdn., 'Iraq, 14/2. W. H. Dolphin, to R.A.F. Base, Malta, 28/2.

Flight Lieutenants W. M. Fry, M.C., to No. 99 Sqdn., Upper Heyford, 2/3. S. C. Strafford, D.F.C., to No. 6 Sqdn., Middle East, 1/3. L. F. Pendred, D.F.C., to H.Q., R.A.F., Transjordan and Palestine, 1/3. C. L. Falconer, to No. 1 Air Defence Group H.Q., 6/3. F. W. Moxham, to No. 1 F.T.S., Netheravon, 5/3. W. G. E. Hayman, to R.A.F. Depot, Aboukir, 1/3. H. H. Brookes, to H.Q., 'Iraq Command, 14/2. H. M. Massey, M.C., to Air Ministry (C.A.S.), 11/3. F. L. Hopps, A.F.C., to No. 99 Sqdn., Upper Heyford, 4/3. J. MacG. Fairweather, D.F.C., to Station H.Q., Kenley, 14/2. M. Wiblin, to No. 1 Air Defence Group H.Q., 11/3. E. L. Ardley, to H.Q., R.A.F., India, 7/3. W. H. Poole, A.F.C., M.M., to H.Q., R.A.F., Transjordan and Palestine, 13/3. J. F. F. Pain, to No. 31 Sqdn., India, 7/3. J. G. Franks, to No. 2 (Indian Wing) Station, India, 7/3. L. G. Maxton, A.F.C., to No. 209 Sqdn., Mount Batten, 8/3. R. Pyne, D.F.C., to C.F.S., Wittering, 7/3. D. M. Fleming, to No. 22 Sqdn., Martlesham Heath, 10/3. L. G. Nixon, to No. 56 Sqdn., North Weald, 5/3. M. H. Ely, to No. 204 Sqdn., Mount Batten, 9/3. E. A. McKinley-Hay, to No. 3 F.T.S., Grantham, 10/3. F. E. Nuttall, to No. 2 F.T.S., Digby, 9/3.

Flying Officers M. A. Platts, to No. 7 Sqdn., Worthy Down, 15/2. R. G. Hart, M.C., to No. 28 Sqdn., India, 24/2. G. N. E. Tindal-Carill-Worsley, to No. 20 Sqdn., India, 7/3. K. E. Parker, to R.A.F. Base, Gosport, 13/1. W. T. Walton, to No. 207 Sqdn., Bircham Newton, 3/3. J. Constable-Roberts, to R.A.F. Training Base, Leuchars, 3/3. J. D'A. Keary, to H.Q., Inland Area, Stanmore, 6/3.

Pilot Officers R. H. Cave Penney, to No. 70 Sqdn., 'Iraq, 14/2. D. H. V. Craig, to No. 26 Sqdn., Catterick, 6/3. J. A. Easton, to No. 31 Sqdn., India, 7/3. F. D. Lockwood, to No. 28 Sqdn., India, 7/3. P. B. Lusk, to Aircraft Depot, India, 2/2. G. D. Emms and L. A. Hutchings, to No. 1 F.T.S., Netheravon, on appointment to Perm. Comns., 8/3. The undermentioned Pilot Officers are posted to No. 1 F.T.S., Netheravon, with effect from 10/3:—F. G. L. Bain, L. T. G. Barber, G. S. Barrett, J. H. Bell, W. J. Brighty, H. G. Burgess, H. T. Clark, R. C. H. Crosthwaite, H. I. Dabinett, E. S. Ennals, G. A. C. Foster, D. McC. Gordon, J. A. Hankins, P. G. Haeton, H. C. Hendrikz, M. H. Kelly, E. G. B. Kiddle, R. L. Kippenberger, C. A. M. Kyrke-Smith, Hon. F. D. H. Lea Smith, R. W. G. Love, J. G. Nolan, H. C. O'Loughlin, J. R. Palmer, M. P. Price, R. Ruston, R. C. Stuckes, J. H. Supple, M. S. Thompson, R. B. Wardman and J. R. Watson.

MEDICAL BRANCH.—Air Commodore J. McIntyre, M.C., M.B., B.Ch., to Air Ministry (D.M.S.), on appointment as Director of Medical Services, 1/3.

Squadron Leader T. R. S. Thompson, to R.A.F. General Hospital, 'Iraq, 27/1.

Flight Lieutenants N. I. Smith, to H.Q., R.A.F., India, 7/3. L. P. McCullagh, to Station H.Q., Duxford, 17/3.

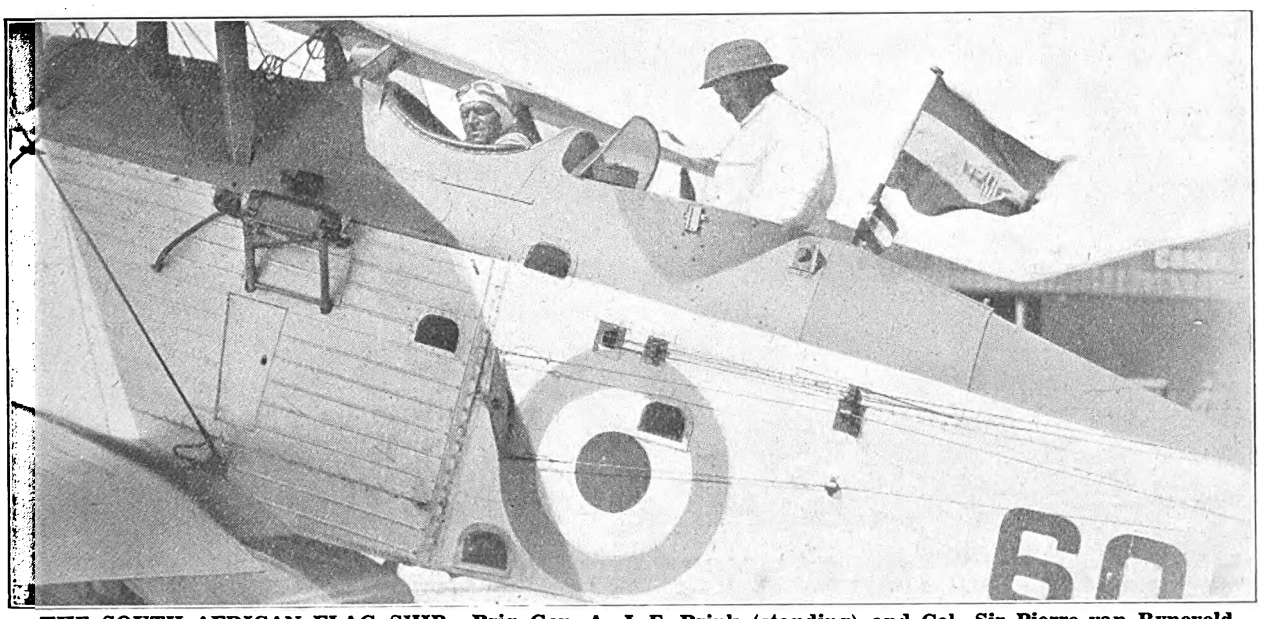
Flying Officer J. S. Webster, to Medical Training Depot, Halton, on appointment to a S.S. Comn., 3/3.

STORES BRANCH.—Flight Lieutenants H. Sleigh, to H.M.S. *Eagle*, 1/3. J. L. Denman, to Station H.Q., Andover, 4/3.

Flying Officers A. E. Haes, to No. 13 Sqdn., Netheravon, 6/3. E. J. Fishenden, to R.A.F. Depot, Uxbridge, 11/2. E. A. Slater, to Aircraft Depot, India, 5/2. C. W. H. Moller, to No. 3 (Indian) Wing H.Q., India, 14/2. P. V. Edwards, to Aircraft Park, India, 7/3. A. Connock, to Aircraft Park, India, 7/3.

A Royal Appointment.

The Air Ministry announces the appointment of Group Captain Henry Cooper, D.S.O., M.R.C.S., L.R.C.P., as an Honorary Surgeon to the King on relinquishment of this appointment by Air Vice-Marshal David Munro, C.B., C.I.E., M.B., Ch.B., F.R.C.S. (E.) (retired).



THE SOUTH AFRICAN FLAG SHIP.—Brig.-Gen. A. J. E. Brink (standing) and Col. Sir Pierre van Ryneveld of the South African Air Force on their arrival at Heliopolis on Feb. 24 after flying with the R.A.F. Flight from Pretoria.

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The King of the Belgians in 'Iraq.

His Majesty the King of the Belgians, who was staying in Baghdad as the guest of the British High Commissioner for 'Iraq, has made a number of flights as a passenger in Service aircraft. On March 18 he flew in a Vickers Victoria to Ramadi to inspect the Police Camel Corps. On March 19 he flew to Babylon, and on March 20 he flew to Mosul. On March 21 he returned to Cairo by air.

His Majesty the King of the Belgians was awarded the Distinguished Flying Cross for flying during the War 1914-18.

Medical Officers in the R.A.F.

In the House of Commons on March 20 in reply to Dr. Vernon Davies, the Under Secretary of State gave the following information in respect of the R.A.F. Medical Branch:—(the first figure is the year, the second the strength in medical officers of the R.A.F. at the beginning of the year, the third is the number who joined during the year, and the fourth the number who left during the year.)

1921, 119—32—18; 1922, 133—45—13; 1923, 165—29—15; 1924, 179—27—19; 1925, 187—22—21; 1926, 188—21—25; 1927, 184—29—20; 1928, 193—17—20; 1929 (to date), 190—17—20.

'Iraq and Palestine.

In the House of Commons on March 20 in reply to Sir A. Knox, the Under Secretary of State for Air gave the following information regarding the cost of the R.A.F. in (a) 'Iraq, and (b) Palestine and Transjordan.

1923-24, £3,575,984—£751,443; 1924-25, £3,188,675—£513,931; 1925-6, £2,512,359—£359,437; 1926-27, £2,207,600—£313,737; 1927-28, £1,392,000—£255,067.

Headquarters, India.

Headquarters of the R.A.F., India, will move from New Delhi to Simla on Mar. 27, 1930. Correspondence from that date should be addressed to:—The Air Officer Commanding, R.A.F., Kelvin Grove, Simla, India.

Armament Specialists.

The following officers of the R.A.F. are entitled to the symbol "A," having successfully completed the Specialist Armament course at the Armament and Gunnery School Eastchurch which ended on January 31, 1930:—

Flt. Lt. C. W. Busk, M.C., A.F.C., Flt. Lt. W. Wynter-Morgan, M.C., Flt. Lt. H. R. F. Baxter, Flg. Off. N. S. Allison, Flg. Off. J. G. Franks.

The Royal Forth Yacht Club.

By courtesy of the Committee of the Royal Forth Yacht Club, Granton, Edinburgh, the privilege of honorary membership has been extended to serving officers of the R.A.F.

No. 45 Squadron Re-Union.

The fifth annual re-union dinner of war-time members of No. 45 Squadron, R.F.C. and R.A.F. will take place at the Crown and Cushion Restaurant, London Wall, E.C. on April 26, at 18.30 hours. All members of the Squadron who wish to attend should communicate with Mr. B. Wetherall, 28 Gladstone Road, Buckhurst Hill, Essex.

The dinner is arranged by non-commissioned members of the old Squadron and has for its function the drawing together of the old members. At all these meetings any cases of misfortune to members of the old Squadron are made known and the surplus funds from each dinner are dispersed among those who are most in need of assistance.

At each of the dinners as many of the old officers of the Squadron who served with it during the War, as have known about the occasion, and have been able to be present, have turned up and joined in the evening's entertainment and met again the men who served them so well during the years 1916-19.

The Zeebrugge-Ostende Reunion Dinner.

Admiral of the Fleet Sir Roger Keyes, Bt., K.C.B., K.C.V.O., C.M.G., D.S.O., will preside at the Zeebrugge-Ostende annual re-union dinner to be held at the May Fair Hotel on April 23.

Notices have been posted to all R.A.F. officers who took part in the operations of April 23 and May 10, 1918 and whose addresses are known. Any who have not received these notices are requested to communicate with Lieut. J. C. Keith-Wright, D.S.C., 82 King William Street, E.C.4 the Hon. Secretary of the Dinner Committee.

An Accident.

The Air Ministry regrets to announce that as the result of an accident at Worthy Down, Hants, to a Vickers Virginia machine of No. 58 Bomber Squadron, Worthy Down, on Mar. 24, Flying Officer Ernest Richard White, the second pilot of the aircraft, and Pilot Officer Percy James Pratt were killed and Squadron Leader Alban Spenser Ellerton, O.B.E., the first pilot, was dangerously injured. No. 370080 L-AC. Donald Angus Reich was slight injured and No. 508749 AC.2. Frederick Bernard Palmer, the remaining occupant of the machine, was not injured.

R.A.F. SPORTS.

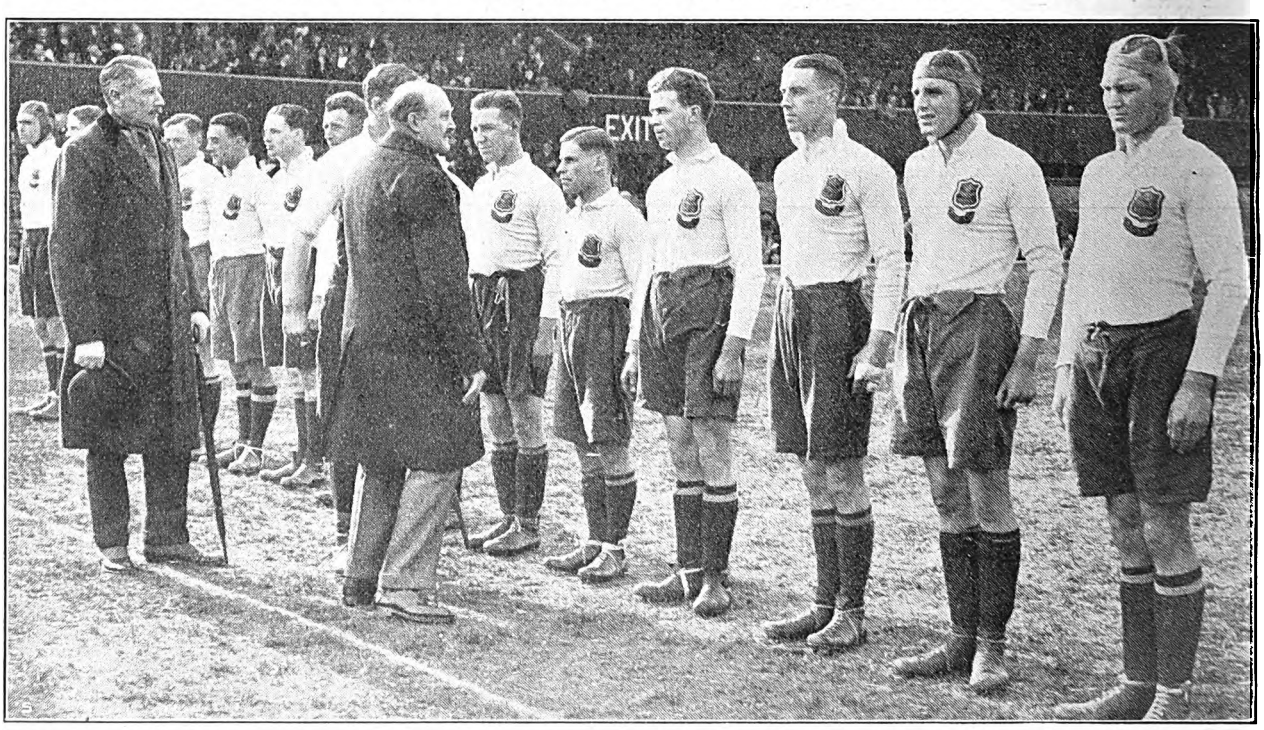
Inter-Service Rugby Football.

R.A.F. versus the Army.—The R.A.F. were beaten by the Army at Twickenham on March 22 by a goal and three tries (14 points) to a goal and a try (8 points).

A review of the history of this match is interesting:—

1920 ..	The Army won by 21 pts to 9.
1921 ..	The Royal Air Force won by 26 pts. to 3.
1922 ..	The Army won by 23 pts. to 8.
1923 ..	The Royal Air Force won by 13 pts. to 8.
1924 ..	The Royal Air Force won by 8 pts. to 3.
1925 ..	Drawn, 6 pts to 6
1926 ..	The Army won by 11 pts. to Nil.
1927 ..	The Army won by 22 pts. to Nil.
1928 ..	The Army won by 18 pts. to 6.
1929 ..	The Army won by 27 pts. to Nil.

Considering that the Navy beat the R.A.F. by 11 points to 3 last month and that the Army beat the Navy by 16 points to 10 three weeks ago, the R.A.F. have nothing to be



ROYAL INTEREST.—The R.A.F. team being presented to H.R.H. Prince Arthur of Connaught before the match against the Army. Behind His Royal Highness is Air Chief Marshal Sir John Salmond, Chief of the Air Staff, and the members of the team, visible or partly visible, are, from right to left, Plt. Off. Wallace, Plt. Off. Williams, Plt. Off. Cotton, AC. Gibbs, Flt. Lt. Odbert, Sjt. Hall, Flt. Lt. Beamish, Sjt. Kerby, Plt. Off. Ievers, Flg. Off. Pott, Flg. Off. N. E. White, Plt. Off. Elsmie and Flg. Off. Beaumont. Flg. Off. G. R. White and Plt. Off. McKechnie are hidden.

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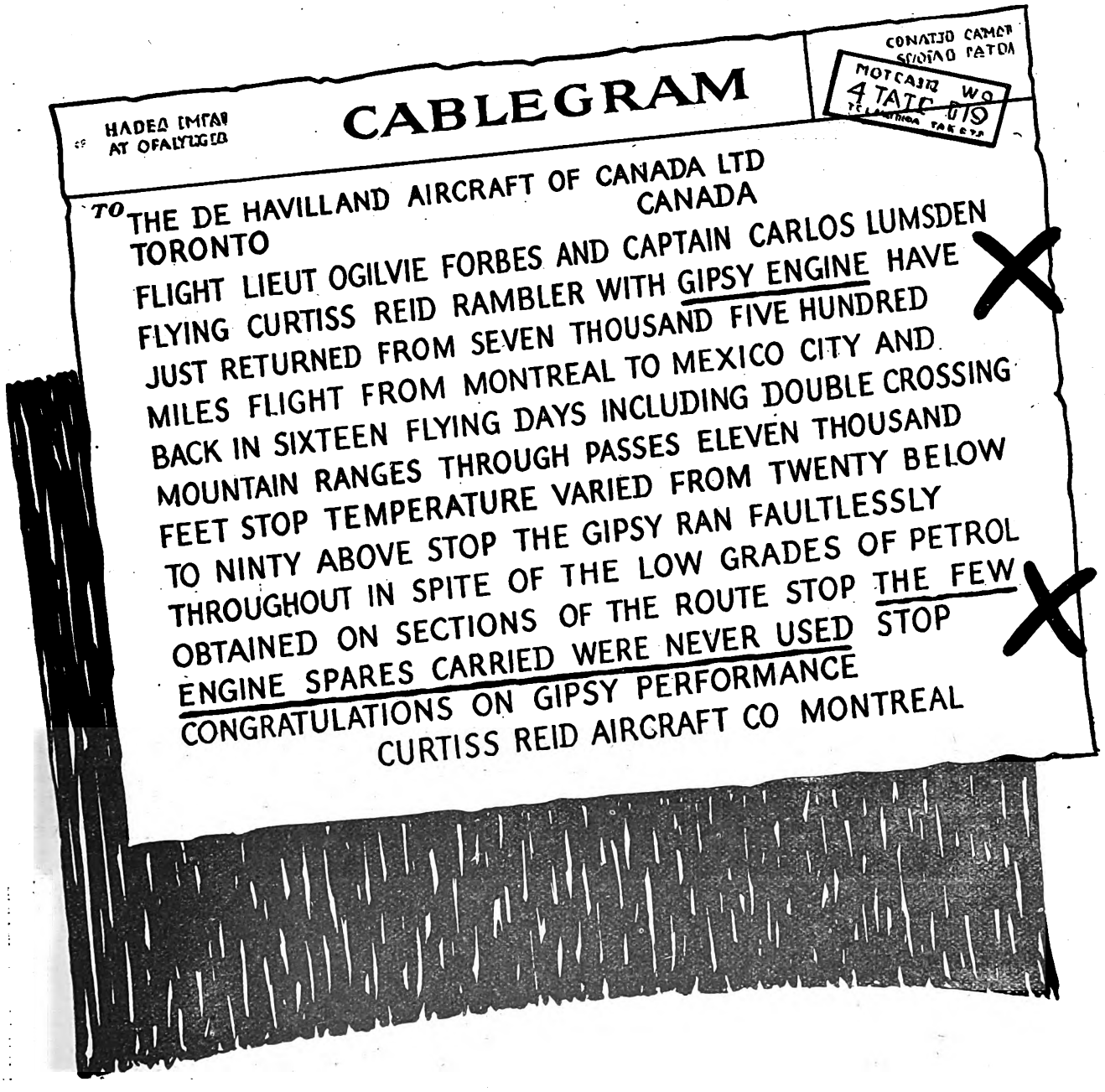
CABLEGRAM

TO THE DE HAVILLAND AIRCRAFT OF CANADA LTD
TORONTO CANADA

FLIGHT LIEUT OGILVIE FORBES AND CAPTAIN CARLOS LUMSDEN
FLYING CURTISS REID RAMBLER WITH GIPSY ENGINE HAVE
JUST RETURNED FROM SEVEN THOUSAND FIVE HUNDRED
MILES FLIGHT FROM MONTREAL TO MEXICO CITY AND
BACK IN SIXTEEN FLYING DAYS INCLUDING DOUBLE CROSSING
MOUNTAIN RANGES THROUGH PASSES ELEVEN THOUSAND
FEET STOP TEMPERATURE VARIED FROM TWENTY BELOW
TO NINTY ABOVE STOP THE GIPSY RAN FAULTLESSLY
THROUGHOUT IN SPITE OF THE LOW GRADES OF PETROL
OBTAINED ON SECTIONS OF THE ROUTE STOP THE FEW
ENGINE SPARES CARRIED WERE NEVER USED STOP
CONGRATULATIONS ON GIPSY PERFORMANCE
CURTISS REID AIRCRAFT CO MONTREAL

The engine which, subject to concise conditions, carries the manufacturer's indemnity against forced landings.

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ashamed of in this defeat and have a good deal to be proud of in putting up such a fine fight against a better side.

For the first time for nine years the R.A.F. team were without Wing Commander Russell at scrum-half in the match against the Army, and although Plt. Off. Elsmie is a most worthy successor, Wing Commander Russell's defence tactics and aptitude for getting his side out of a tight corner under pressure were missed.

The greatest strength in the R.A.F. team lay in their forward line, which very early in the game showed itself superior to the Army pack. The Army's first try, twenty minutes from the start, so showed up the weakness of the Air Force backs that Flt. Lt. Beamish, the captain, took Sjt. Kerby out of the scrum and gave him a roving commission behind the threequarter line. That he did well to take this rather dangerous step was proved as the game went on. The seven Air Force forwards held the Army pack and Sjt. Kerby was invaluable as an extra defender.

The first twenty minutes was fast and open with plenty of straight running and keen tackling. Wainwright and Novis on the Army right wing made several determined runs and had the game well into the Air Force twenty-five. Then Beamish got away from an Air Force forward rush, but knocked on. Williams took a kick at goal from a penalty but failed. Ievers broke away from a scrum, punted ahead and followed up, but Hunt cleared before he went down. Rice-Evans scored the first Army try with a good cut through which which surprised the Air Force backs who were all badly placed. Nott failed with the goal kick.

Cotton snapped up the ball from an Army forward rush and found touch with a splendid kick. Two minutes from the Army's first try they scored a second. McCreight whipped the ball out of the scrum, dodged Elsmie and passed to Cole who ran half the length of the field to score between the posts. Elsmie and Ievers both hurled themselves at his ankles, but he was a shade too fast for them. Nott kicked the goal.

Williams made a magnificent effort to kick a penalty goal for the Air Force shortly after this. but the ball fell short. N. E. White made ground, but was forced into touch. Kerby fielded the ball from the line-out and kicked ahead. Hunt fumbled the ball but other Army backs got round and there was another line out near the flag. The Air Force were slowly driven back, their three-quarter attacks breaking down through failure to make use of their wing men.

Some useful combined boot-work by the Air Force forwards headed by Beamish recovered the lost ground and Beamish, with a hand-off which echoed round the stands took the ball down the wing for Gibbs to score near the flag. The goal kick failed.

The second half opened with a good handling movement by the R.A.F. backs, with a fine run by G. R. White, but the Army defence outwitted them. Kerby tried the punt ahead and quick follow-up, but Hunt fielded and made a mark.

A good bout of short passing between McKechnie, Cotton and N. E. White gained ground, but failed to score. Strong Army pressure followed a movement started by Hunt, and resulted in a try scored by Townend which was not converted.

Odbert cut through on two occasions at this stage, but both times passed too late. N. E. White made a good run, but turned inside and lost the ball instead of passing to Kerby, who was unmarked on the wing. A dangerous attack by the Army was blocked by keen Air Force tackling near the line, and McKechnie gathering the ball recovered the lost ground. A bout of long-distance kicking ended with a fine kick to touch by Ievers.

The second Air Force try was scored by N. E. White from a bout of top-speed passing between Elsmie, Odbert and Cotton. White ran straight and fast for the line and scored without interruption. Gibbs kicked a fine goal from an awkward angle. Five minutes later McCreight and Wainwright combined for the latter to score a neat try for the Army.

The last five minutes was tough Rugger, but without a further score.

The teams were :—

THE ARMY.—Sec. Lieut. E. W. F. de V. Hunt (R.A.), back; Lieut. G. Peddie (R.A.), Sec. Lieut. J. A. M. Rice-Evans (2nd Battalion, The Welch Fusiliers), Sec. Lieut. A. L. Novis (2nd Batt. The Leicestershire Reg.), and Sec. Lieut. J. W. Wainwright (R.A.), three-quarter backs; Sec. Lieut. J. R. Cole (2nd Batt., The Loyal Reg.) and Sec. Lieut. C. C. McCreight (R.A.), half-backs; Cpl. G. Townend (1st Batt., The Duke of Wellington's Reg.), Lieut. H. H. C. Withers (R.E.), Lieut. H. Rew (Royal Tank Corps), Capt. C. H. B. Rodham (Indian Army), Sec. Lieut. R. G. S. Hobbs (R.A.), Sec. Lieut. D. H. Nott (2nd Batt, The Worcestershire Reg.), Sec. Lieut. K. J. MacIntyre (Royal Tank Corps), and Lieut. K. M. Wright (R.A.), forwards.

ROYAL AIR FORCE.—Plt. Off. G. M. Ievers (Digby), back; Plt. Off. G. R. White (Digby), Flg. Off. J. R. H. Pott (Grantham), Plt. Off. R. D. Cotton (No. 19 Sqdn., Duxford), and Plt. Off. N. E. White (No. 29 Sqdn., North Weald), three-quarter backs; Flt.-Lieut. R. V. M. Odbert (Andover) and Plt. Off. G. R. A. Elsmie (No. 43 Sqdn., Tangmere), half-backs; Plt. Off. W. V. M. McKechnie (Calshot), Flt.Lieut. G. R. Beamish (Henlow), Sjt. W. H. Kerby (Halton), Plt. Off. G. E. S. Williams (No. 2 F.T.S., Digby), Flg. Off. J. Beaumont (No. 4 Sqdn., Farnborough), Sjt. A. C. Hall (Wittering), Aircraftman D. R. Gibbs (Sealand), and Plt. Off. R. L. Wallace (No. 17 Sqdn, Upavon), forwards.

Referee.—Mr. B. S. Cumberlege.

Before the game the teams were presented to H.R.H. Prince Arthur of Connaught.—C. M. MCA.

Association Football.

The match between the Royal Navy and the Royal Marines and the Royal Air Force will be played on March 29 at the Millwall Club Ground, New Cross, S.E.14. The kick-off will be at 15.30 hours.

Henlow v. Netheravon.—The semi-final for the R.A.F. Cup between Henlow and Netheravon was played at Uxbridge on March 19, and resulted in a win for Henlow by 3 goals to 1.

The weather was fine but intensely cold. Netheravon began facing the sun and immediately set off at a terrific pace, Malin fisting away from Witt. For a few minutes Henlow were outpaced, their backs and halves working desperately. Malin made a smart clearance from Owen, and Henlow then had a turn of the play, Shellis nearly heading through his own goal from a smart centre by Seaney.

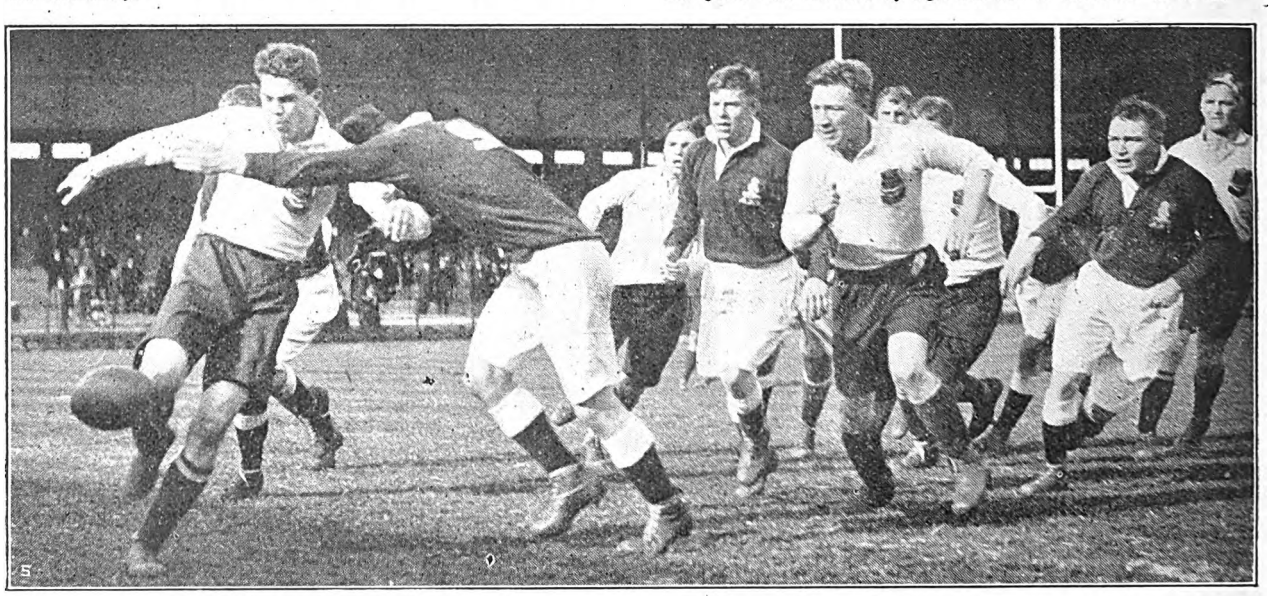
After fifteen minutes Maidment dropped the ball right in the Henlow goalmouth, and Stuckes netted with a shot which gave Malin no chance. This reverse served to pull the Henlow team together. Attacking strongly, Seaney and Kelly attempted to bustle custodian and ball into the net, and in evading their rush Ballard was penalised for carrying. The Netheravon players lined the goal for the free kick, but Seaney tapped the ball to West who had no difficulty in finding the net.

Fast end to end play followed, and a splendid shot from West was tipped away by Ballard. Eventually West got away on the wing and middling smartly, Rule dashed in and put Henlow ahead. Less than two minutes later, West gave a repetition of his previous effort and Kelly headed a neat goal.

On the resumption of play, Netheravon again attempted to force the pace, but Pond and Lowe compelled them to confine their efforts to straggling long shots, which were confidentally dealt with by Malin. Cockle had a good opportunity, but shot across the Henlow goal. Pond conceded a corner by miskicking, and from Cockle's flag kick, Hopkin drove in hard, but Malin again saved brilliantly. Goodwin attempted to score from a free kick, but the Henlow custodian fisted away, despite the efforts of Stuckes and Owen to rush the ball into the net.

At the other end West and Seaney tested Ballard with good shots, but the play in general was ragged throughout the second half, Henlow apparently being content to rest on their laurels.

The game was refereed by Sgt. Parrish of Sealand.—C. H. H.



CLEARED !—Aircraftman D. R. Gibbs getting rid of the ball in the R.A.F. match against the Army on Mar. 22. AC. Gibbs scored one try and converted a try. In the foreground is Sjt. W. H. Kerby, who played a fine game as an eighth back.

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AUGUST, 1929.

The Polish aviators, Zwirko and Wigura, using an R.W.D. with a 40 H.P. SALMSON engine, accomplished the following flight:—

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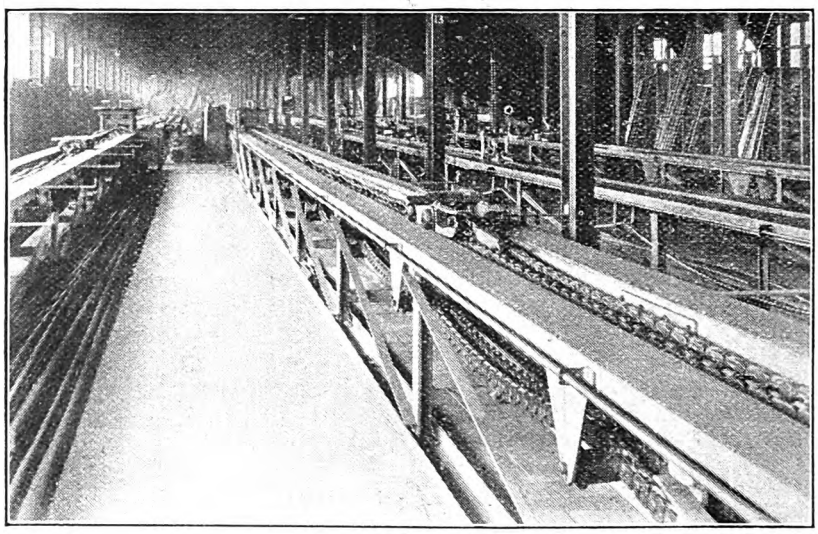

View of the four draw-benches in the Boulton & Paul Works.

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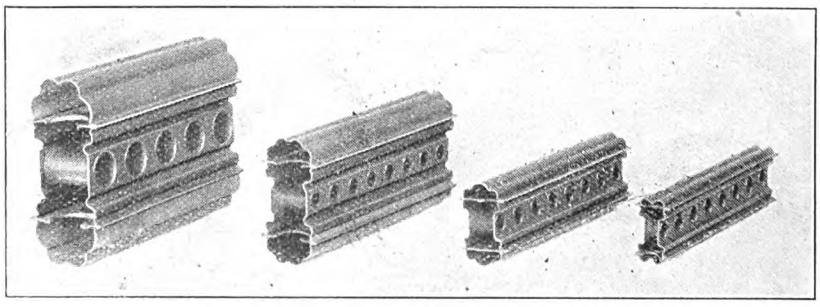

Four of the range of standard steel Spar Sections designed and manufactured by Boulton & Paul Ltd.

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AERONAUTICAL ENGINEERING
SUPPLEMENT TO "THE AEROPLANE"

THE EVOLUTION OF THE MODERN AERO ENGINE.

[*A précis of a lecture delivered at Cambridge University by Mr. D. R. Pye, Deputy Director of Scientific Research, The Air Ministry.*]

There is a difference between lecturing on engines and on aeroplane design. Aerodynamic performance depends on certain general principles which can be appreciated without detailed knowledge, but the success of one engine and failure of another may apparently depend on details of mechanical design. It is broadly true that the more general the principles with which a lecture deals the more satisfaction the layman can get out of it: an example was public interest in relativity. I cannot hope to give a sense of extending the mental horizon but will endeavour to steer clear of too much detail.

I thought it would be of interest to look back over the evolution which has taken place in the design of engines and to examine why some designs persist and why some have dwindled and died.

In all essential components (*e.g.*, cylinders, pistons, crankshafts, etc.), aero-engines are much the same as the motor-car engine, but there are certain special conditions to which it has had to adapt itself.

The special features on which aero-engine designers must concentrate are:—

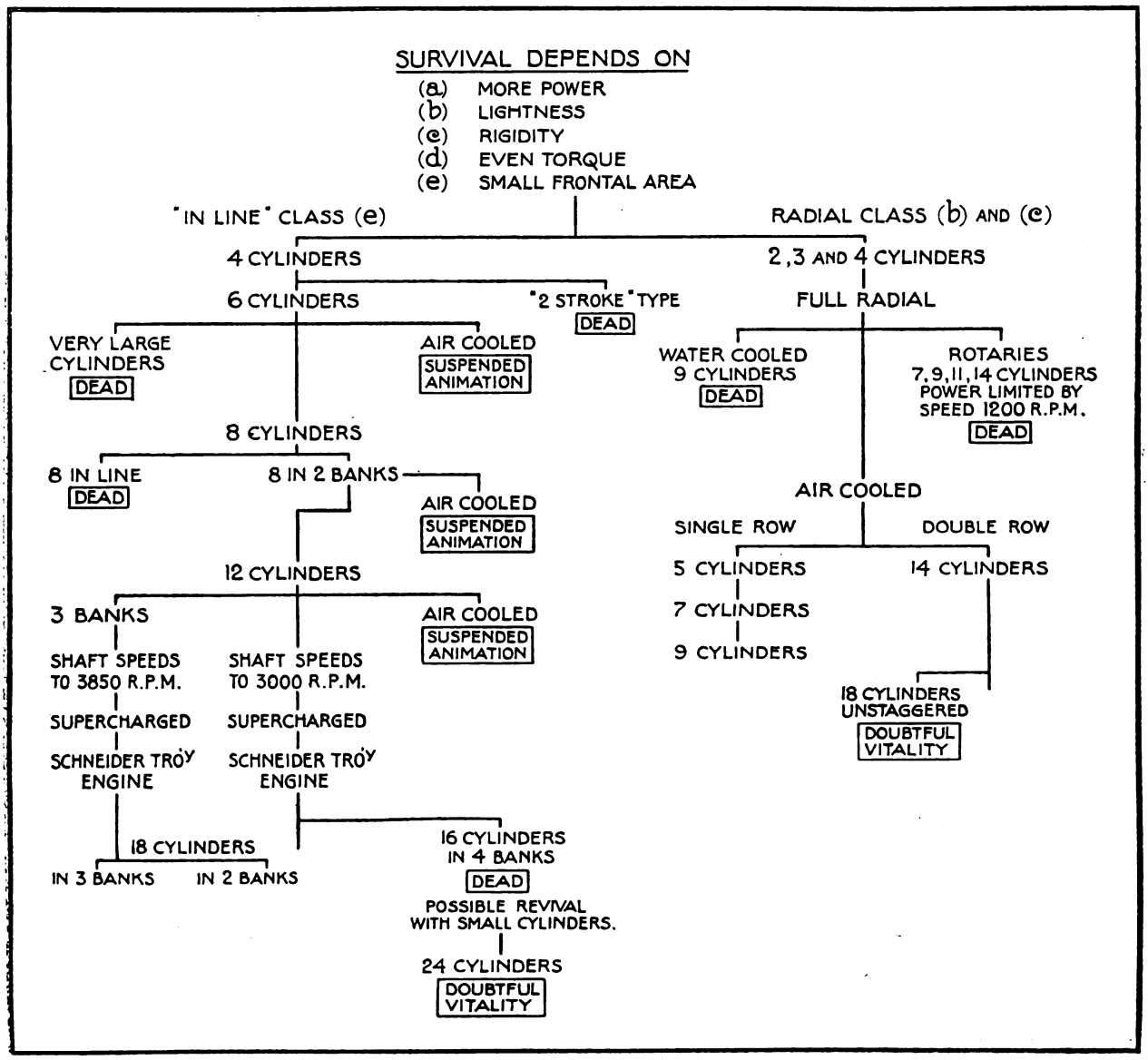
(1) High power-to-weight ratio.
(2) Small frontal area.
(3) Perfect balance and rigidity within itself, as it is mounted in a flexible framework.
(4) Evenness of turning moment on the crankshaft.
(5) Economy of fuel consumption.

One of the first aero-engines was Hiram Maxim's engine of 1894. This was a steam engine and only comes in as an ancestor to the modern aero-engine in the same degree as the chimpanzee formed a preface to the evolution of man. Two engines of this type lifted Maxim's machine, weighing 3½ tons, from the ground.

Herewith appears a sort of genealogical table—not in any true sense a genealogical table, for only in a very few cases can one type of engine be said to derive from another.

The table divides into two main branches, the "in-line" class and the radial class, although there are a few types on the border-line which it is impossible to place definitely.

The table illustrates the many paths, fruitful and unfruitful, along which the ingenuity of designers has been exercised.



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Also, some certain types have developed and established themselves. Others have proved ill-adapted to their environment and have died out.

In the in-line class the table shows, generally speaking, the development of the high-power engine from the four-cylinder-in-line up to engines with as many as 24 cylinders on one shaft. The outstanding quality of the in-line engine is its small frontal area.

As design developed the tendency was to crowd the cylinders closer and closer together in order to keep the shaft as short as possible and to divide the cylinders into two, three, and even four banks for the same reason. In the most modern Rolls-Royce "F" engine the cylinders are so close that from the inside of one to the inside of the next is only ⅜ inch.

During the development which has reached this stage of perfection, there have been various unfruitful off-shoots. In 1911, for example, a two-stroke engine was attempted with the idea of getting more power from the same cylinder capacity. The limitations of the two-stroke engine are dealt with later in the lecture.

An eight-cylinder-in-line had the drawbacks of bad distribution and flexibility in the shaft. At one time it was thought that for Civil Aviation large cylinders and low crank-shaft speeds would be the line of development for the sake of reliability. This view was possibly founded on the reliability of the six-cylinder German engines in the War 1914-18, but it has been quite falsified by time.

Increase of power is obtained, apart from increase of speed, by an increase in the induction air pressure in the cylinders, known as super-charging. In an early example of the supercharged engine the air was compressed beneath the working pistons. Nowadays the supercharging is done by independent blowers driven through gearing from the main shaft.

Exhaust-driven superchargers have been fitted to a Napier Lion engine, and to a Rolls-Royce Condor. The lecturer explained that when this type of supercharger was first fitted to the Lion engine it was clear that the engine was not suitable owing to the length of pipe-work necessary. When it was fitted to a Condor, although it went together very satisfactorily, it was found that the amount of heat which had to be dealt with was excessive, and it was impossible to keep exhaust-pipes and turbine reasonably cool.

Discussing a series of radial engines the lecturer pointed out that the rotaries are limited in respect to speed (and therefore horse-power) to about 1,200 r.p.m. by centrifugal force. For this reason the fixed radial has superseded the rotary.

In the Canton-Unné (Salmson) design a nine-cylinder radial engine was water-cooled. This involved not only the large head resistance of the radial but also that of a radiator.

A Canton-Unné engine was built before the War in which an attempt was made, while retaining the short shaft, and light and compact construction, of the radial engine, to get over its large head resistance by introducing a right-angle drive so that the airscrew-shaft was parallel with the plane of the cylinders. There was also a Salmson engine in which as many as eighteen cylinders were built into the radial form.

The Redrup engine illustrates an attempt to combine the advantages of air-cooling and absence of a multi-throw-crank-shaft with small head resistance by placing the cylinders round the crank-shaft and parallel to it. Operation is through a wobble-plate mechanism.

Having traced the evolution of design to the point it has reached at present, the lecturer considered some general questions of performance which lead to interesting problems of future development.

Since the War although weight per horse-power has been reduced from rather over 3 to 2 lbs. per horse-power, and even to ¾ lb. per horse-power in the Schneider engine, there has been little or no improvement in fuel economy during that time. Most engines in service use over half a pound of fuel per horse-power per hour, and probably as much as .6.

For a three-hour flight it is just as much worth while to save 10% of the fuel which has to be carried as to lighten the engine by a further 10%. So far no one has seriously bothered about fuel consumption, but it is an aspect of the problem of which the importance will be more and more prominent.

On the civil side it means an increase in paying load: on the service side an increase of range. Recent experiments with a flow-meter have shown that for identical aircraft flying in formation for a certain time, some use 50% more fuel than others. Research is now being carried on towards the perfection of a device which will automatically keep the fuel-and-air mixture correct, both for changing altitude and change of engine throttle.

Even when perfect compensation is achieved the thermal efficiency of the engine must be improved. For this purpose it is desirable to have a high compression ratio. But any attempt to do this, or to supercharge for the sake of getting a better power-to-weight ratio, introduces difficulties of overheating, more especially overheating of the exhaust-valve.

The only possible escape from the red-hot exhaust-valve in the supercharged engine appears to be a sleeve-valve. Little progress has been made with this valve since it was invented sixteen years ago. Single-cylinder research has proved that the sleeve-valve is capable of operating at the highest speeds and with far higher supercharging than any poppet-valve can be made to stand. It seems possible that because it is the only escape from the overheated valve the purely mechanical difficulties of its construction will be got over.

The other path for improvement in fuel economy is the Diesel cycle. A saving of fuel of at least 20% for the same power is an accomplished fact. But the problem is to increase the power obtainable from a certain size of cylinder to a point comparable with that of the petrol engine.

The engines for R.101 give first-rate economy—.4 lbs. per b.h.p. hour as against .5 or more for the petrol engine —but weighs 7 or 8 lbs. per horse-power. There are good hopes of cutting down that figure to something over 3, but there are fundamental reasons why the Diesel engine is likely to be heavier for a given output than the petrol engine.

The advantage of cheap fuel for the Diesel engine was a will-o'-the-wisp. As soon as it was generally introduced the price would go up. There are several real advantages, apart from fuel economy, however,—the low rate of inflammability of the fuel, and the sweeping away of complexity, and of radio interference, by eliminating electric ignition.

There are two lines of development which at first sight look very attractive but hitherto have made no headway. One is the two-stroke engine; the other is the internal combustion turbine.

The reason why the two-stroke engine cannot compete with the four-stroke is that it has to clear out the used gases and take in a fresh charge in about one-fifth of the time available in the four-stroke. At low speeds it is possible to get a full cylinder-charge, but at the speeds at which the four-stroke engine now works successfully, the M.E.P.'s obtainable are so low as to more than destroy the advantage of having a working stroke in every revolution.

As regards turbines the necessity for a high-vacuum condenser puts the steam turbine completely out of court. The practicability of the internal combustion turbine is limited by two factors—the need for a high-efficiency compressor for the air before combustion, and for materials which will stand high working stresses at temperatures of 700° or 800° Centigrade.

As regards rocket propulsion, that must always be very inefficient until the thing propelled moves at 800 or 900 miles per hour. It would be possible to some extent to get over this inefficiency if the jet instead of shooting out direct from the aircraft were made to shoot out from the tips of a propeller on the principle of the garden-lawn sprinkler. Theory has shown that a hollow propeller with jets at the tips may possibly form a light and cheaply constructed power-plant.

A test rig has been built to explore the possibility. Although very interesting scientific results had been obtained it is found that the difficulty of getting high-efficiency jets, and also the difficulties of satisfactory combustion of the fuel, seem to rule out this form of prime mover from being a practical success.

These projects are very far from the well-tried aero-engine. Piston, cylinder and crankshaft may seem a clumsy arrangement but it has shown remarkable vitality and adaptability and it will be many years before turbines or flaming swords can put up any serious challenge to the piston engine as a power unit for aircraft.

[From these condensed opinions of one of the most experienced and knowledgeable men concerned with aero-engines in this country two chief facts seem to emerge,—first, that the sleeve-valve is likely to supersede the poppet-valve, and second that we may reasonably hope for the compression-ignition heavy-oil engine.

At intervals for more than ten years past this paper has drawn attention to the merits of the Burt valve, which its inventor used to call a cuff-valve to emphasise its advantage over the long double-sleeve Knight valve. But for some curious reason it has been slower in coming into its own than even the Handley Page Slot has been, for one remembers the Burt valve as far back as 1910,—and it worked quite successfully then, as Colonel Matthew, now of the Dunlop Co., can doubtless bear witness. And it has been used for years by Mr. Ricardo in his delicate and accurate researches in fuels and lubricants.

As for the heavy oil engine,—one is merely tired of talking about it.—C. G. G.]

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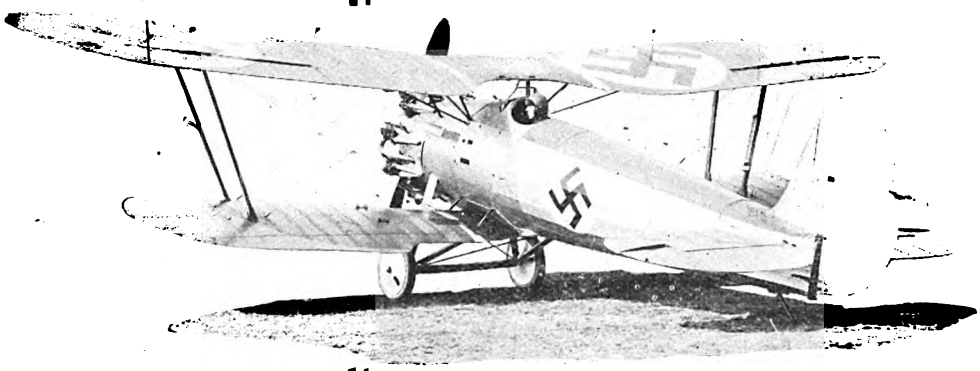
MORE "Bristol" BULLDOGS FOR LATVIA

In 1929, after very close investigation and consideration, the Latvian Government placed an order with the Bristol Aeroplane Co. Ltd. for five "Bristol" Bulldog all-steel single-seater fighters. So pleased are the Latvian authorities with the outstanding qualities of these machines—a satisfaction amply shared by the Latvian pilots—that a further order has been placed for seven additional "Bristol" Bulldogs.

The purchase was decided upon in spite of intense competition by other manufacturers of single-seater fighters from many countries, because the Latvian Government have tested out the Bulldog machine over many months and have found that every claim made on its behalf has been amply substantiated.

The neighbouring country of Esthonia has also ordered twelve "Bristol" Bulldogs.



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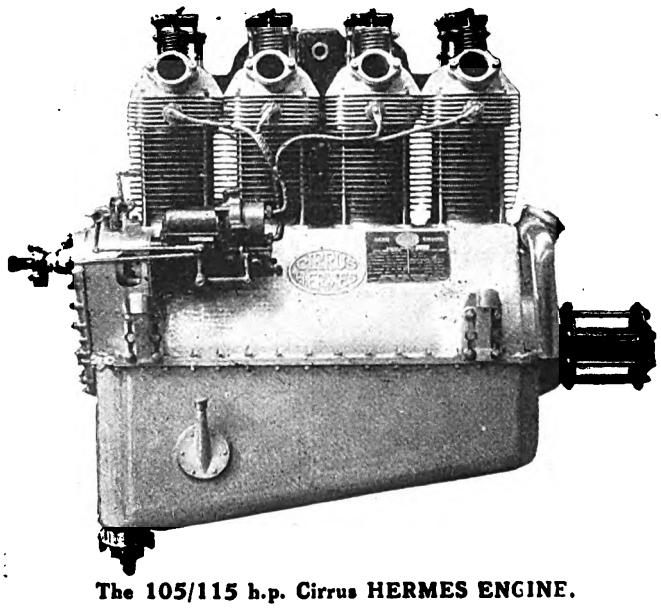
THIS IS THE FIRST ENGLISH LIGHT CABIN MACHINE CARRYING TWO PEOPLE TO FLY TO AUSTRALIA.

IT IS THE THIRD FLIGHT TO AUSTRALIA BY LIGHT AIRCRAFT IN WHICH A CIRRUS ENGINE WAS INSTALLED.

IT PROVES QUALITIES OF THE DESOUTTER SPORTS COUPE AND THE RELIABILITY OF THE HERMES ENGINE.

MACHINE AND ENGINE WERE STANDARD, EXCEPT FOR EXTRA TANKAGE, AND TAKEN FROM STOCK. IT WAS ONLY FLOWN A FEW HOURS BY BOTH PILOTS BEFORE THIS FLIGHT, AND PROVES THE EASE OF FLYING THIS TYPE OF MACHINE.



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DARWIN, AUSTRALIA:—
FT WONDERFUL UNDER ALL

Flying Officers H. L. Piper and C. Kay with their HERMES DESOUTTER SPORTS COUPE at Croydon before the flight. The machine weighed 2,000 lbs. on taking off at Croydon, a testimony to the pulling power of the engine.

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INVERTED ENGINES IN AMERICA.

The successful production of the Inverted Gipsy Engine, or Gipsy III, as it is called officially, gives the more interest to a group of inverted in-line engines recently produced in the United States, and described hereafter.

Why the inverted engine has been so long in coming is one of those little mysteries of World-Industry which must remain unsolved. Quite a promising inverted four-cylinder engine was produced in Paris in 1909 by M. Gregoire, who called it the "Gyp,"—after a lady friend. And at intervals since its foundation in 1911 THE AEROPLANE has pointed out the great benefits to be had from this type of engine, because of its high thrust-line with consequent better ground-clearance for the airscrew, and its lower centre of gravity, and the clear view over the crankcase.

However, now it has arrived, and Aviation, especially in the lighter class of aircraft, ought to benefit very considerably.

THE FAIRCHILD 6-390.

MAKERS.—THE FAIRCHILD ENGINE CORPORATION, FARMINGDALE, N.Y.

TYPE.—Six-cylinder in-line inverted air-cooled.

CYLINDERS.—Bore 4 in. (102 mm.), Stroke 5¼ in. (130.2 mm.), Compression ratio 5.2 to 1. Forged steel barrels screwed and shrunk into heat-treated cast aluminium-alloy heads. Aluminium-bronze valve-seats, valve-guides and sparking-plug bushes shrunk into head. Spherical combustion chamber.

PISTONS.—Cast aluminium-alloy pistons with three compression and one scraper ring. Fully floating gudgeon pin.

CONNECTING RODS.—Connecting rods of "H" section are rolled and forged from heat-treated alloy steel. Small ends have bronze-bushes, big ends are white-metal bushed.

CRANKSHAFT.—Crankshaft forged in one piece from heat-treated alloy-steel and runs in seven main white-metal bearings.

CRANKCASE.—Crankcase is made from heat-treated aluminium-alloy castings and is split along the crankshaft centre-line with sections at rear and nose. The nose section contains the thrust bearings, accessory shaft drive, and camshaft-drive, the rear section contains the oil pressure-pump and oil filter.

VALVE GEAR.—The underhead camshaft is driven by a vertical spindle operated from the front end of the crankshaft. Cam-timing is done by slipping the gears on the camshaft and vertical spindle out of mesh and resetting them on the splined shafts. There are one inlet and one exhaust valve per cylinder which have double springs and are driven through rockers. These rockers have roller-contact with the cams and adjustable ball-ended screws over the valves. The whole gear is enclosed.

INDUCTION SYSTEM.—One Stromberg N.A.R.-3A carburetter supplies gas to a Tee piece which is heated by exhaust muffle and thence by two three-port cast manifolds to inlet valves.

IGNITION.—Two Scintilla P.N.6 magnetos are mounted at rear of crankcase on inclined brackets which keep the magnetos close to the crankcase. They are driven by toothed-type flexible-couplings from the accessory-drive shaft.

LUBRICATION.—The oil-pressure is about 60 lbs. per sq. in. and is forced from the pump at the rear end through the accessory drive-shaft which runs close to the crankshaft. The crankshaft is lubricated by passages from the accessory-drive shaft bearings to the main bearings. Oil is supplied to the camshaft through the hollow vertical spindle. There is also a conduit at the rear of the engine from the accessory drives to the camshaft cover. The scavenging pump is at the rear of the camshaft cover, which acts as a sump. The oil is then returned by way of the oil tank to the pressure pump.

AUXILIARY DRIVES.—Standard drives for two tachometers, generator, fuel pump and starter are driven by spur gears from the auxiliary shaft. This is operated from the front end of the crankshaft to ensure minimum torque variation.

AIRSCREW DRIVE.—Direct; no other data available.

WEIGHT DRY.—335 lbs. (152 kgs.) without starter, fuel pump or airscrew hub.

COWLING.—Proper cooling is ensured by built-in cowling supplied with engine.

PERFORMANCE.—Normal output 120 h.p. at 2,100 r.p.m., Maximum output 130 h.p. at 2,200 r.p.m., Fuel consumption .55 lbs. per h.p./hour (.249 kgs. per h.p./hour), Oil consumption .025 lbs. per h.p./hour (.0113 kgs. per h.p./hour).

THE MENASCO PIRATE.

MAKERS.—MENASCO MOTORS INC., LOS ANGELES, CAL.

TYPE.—Four-cylinder-in-line inverted air-cooled.

CYLINDERS.—Bore 4½ ins. (114.7 mm.), Stroke 5⅛ ins. (130.2 mm.), Compression ratio 5.5 to 1. Nickel iron castings with long sleeves protruding into crankcase to provide oil baffles. Cast aluminium alloy heads, with forged bronze valve seats and sparking plug bushes shrunk in.

PISTONS.—Aluminium alloy with three compression and one scraper ring.

CONNECTING RODS.—"I" section alloy steel. One-inch nitroloid gudgeon pin All bearings are steel-backed and babbitt-metal lined.

CRANKSHAFT.—Chrome-nickel steel crankshaft carried on five bearings.

CRANKCASE.—Aluminium casting in two sections split along the crankshaft centre-line. Ribbed and braced in girder fashion. All oil lines are cored in the castings. Two breather caps in top cover. Max. width of crankcase: 11⅞ ins. (301.2 mm.), Height of crankcase cover above crankshaft centre-line 6 1-16 ins. (153.4 mm.).

VALVE GEAR.—Underhead rocker arms placed fore-and-aft operated by pushrods between cylinders. This combined with ample longitudinal head finning ensures free passage of air across all cylinder heads. Rocker arm contact with valve stem is by roller. Two camshafts, inside crankcase, driven off crankshaft by four stub tooth gears, three of which are of the same pitch and diameter.

INDUCTION SYSTEM.—One Stromberg N.A.R.-3a carburetter placed immediately behind rear cylinder, the gas proceeding thence through oil-muffled pipe to middle of branched induction manifold.

IGNITION.—Two flange-mounted Scintilla magnetos firing two plugs per cylinder mounted on rear of crankcase and driven off the rear end of the crankshaft.

LUBRICATION.—Oil supplied by gear-driven pump at approximately 40 lbs. pressure and returned to tank by two scavenger pumps. Lubrication of rocker-arm mechanism through hollow push-rods.

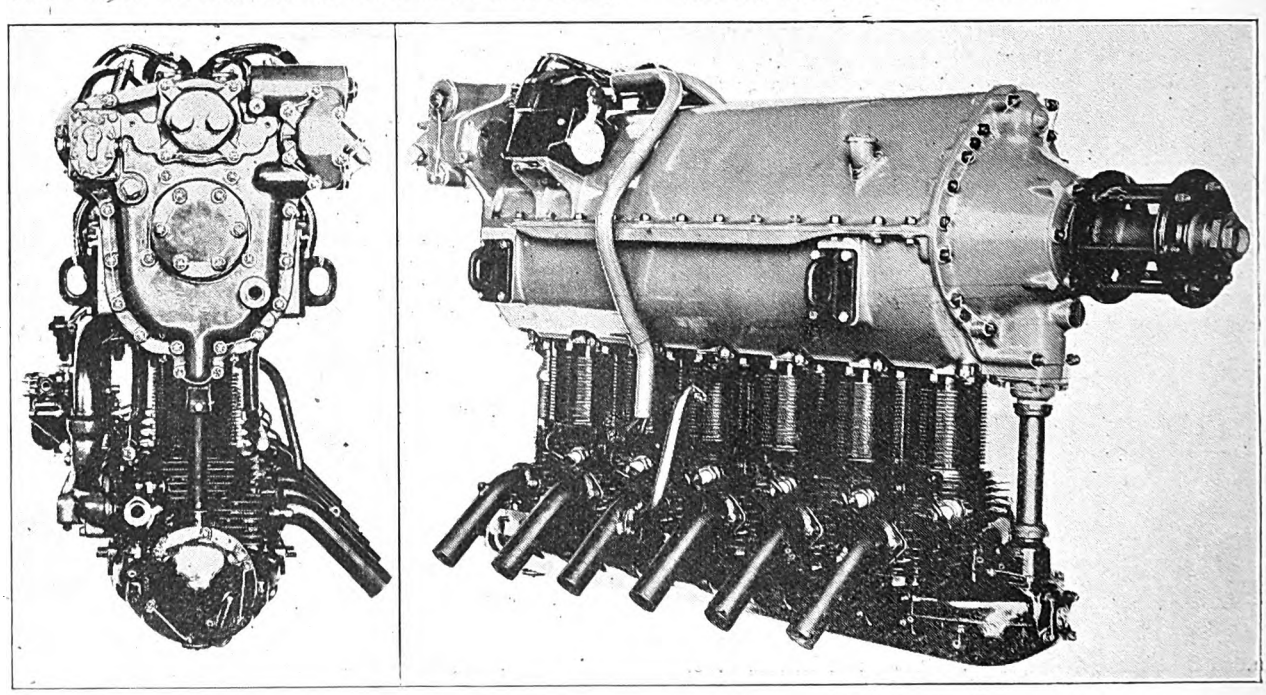
AUXILIARY DRIVES.—All accessories of engine mounted on or in rear accessory case, which may be removed by undoing thirteen nuts. Provision is made for fuel pumps, starter, tachometer drive, adjustable oil by-pass, filter screen and drain plug.

AIRSCREW DRIVE.—Direct through No. 10 S.A.E. splined flange.

WEIGHT, DRY.—270 lbs. (122.4 kgs.).

PERFORMANCE (ESTIMATED).—Normal output 90 h.p. at 1,925 r.p.m., Fuel consumption .53 lbs. per h.p./hr. (.24 kgs. per h.p./hr.), Oil consumption .010 lbs. per h.p. hr. (.0045 kgs. per h.p./hr.).

DIMENSIONS.—Length overall 45 ins. (1.156 m.), Height overall 28¼ ins. (.844 m.), Width overall 13½ ins. (.343 m.).



AN AMERICAN INVERSION.—The 120 h.p. Fairchild 6-390.

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Our Type Av. 680.

This unique "Time of Flight" Clock has been evolved after years of research and investigation. It is a fully jewelled and accurate Eight Day Clock, with high quality movement.

Time of Flight or subsidiary 12 hour dial, working with a long centre seconds hand, enabling periodic timings in hours, minutes, seconds and fifths of seconds to be taken at will. This subsidiary timing can be used for recording

(a) Time of Flight.
(b) Period of Stop.
(c) Computing average speed,
etc., etc.

The long seconds hand and the small hour and minutes hands work in unison, and are operated by the right-hand button on the bezel, thus—

1st push, Start.
2nd ,, Stop.
3rd ,, Return to zero.

The left-hand button is for winding the Clock and for setting the ordinary time hands.

Standard Finish: Aluminium Case, with all black bezel and dial, with white markings.

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Dial Diameter: 3". *Depth:* 1¼" (including back strap fixing and screws—1⅞").

Weight: 10½ ozs.

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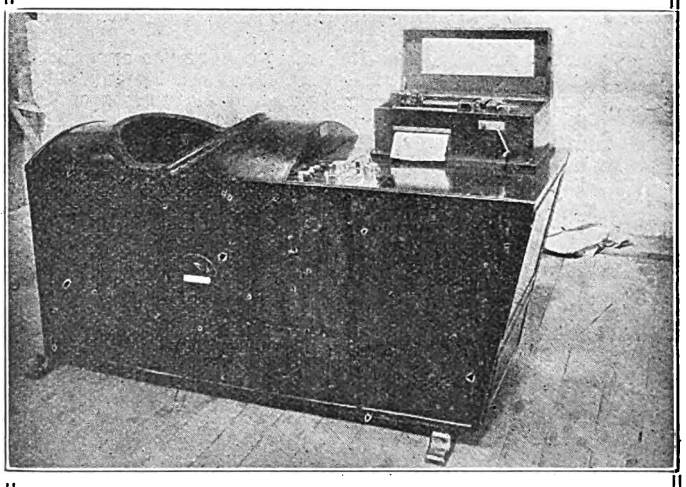

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Fuselage.—A small nacelle built into the leading edge of the wing carries the engine. There is no conventional fuselage as the pilot and passenger sit in the wing.

Tail Unit.—High aspect ratio tail-plane and elevator with a fin and rudder at each end. The whole structure supported by two parallel booms from the wing. There is no cross-bracing and the structure is lighter than conventional as no landing loads are taken through this structure.

Undercarriage.—Special three-wheel arrangement which will be retractable into wing on standard models. Two wheels form a conventional divided-undercarriage with track of 9 ft. (2.743 m.). They are however further forward of the C.G. than usual. Aft of these and on the centre-line is a third steerable wheel.

Power Plant.—[Pusher arrangement.]—One specially-inverted American Cirrus Mk. III four-cylinder in-line air-cooled engine is mounted in a streamline nacelle projecting in front of the wing. The pusher airscrew, which revolves between the parallel booms, is driven by a tubular steel shaft carried in a large ball bearing on a fin built up from the trailing edge of the wing. The front end of the shaft is flexibly coupled to a light flywheel mounted on the engine crankshaft. This drive weighs 35 lbs. (15.9 kgs.) and has proved free from vibration or torque oscillation.

Power Plant.—[Tractor arrangement.]—One Menasco A-4 four-cylinder in-line air-cooled engine mounted as above drives a tractor airscrew. In both cases cooling air is supplied through an opening in engine cowling and escapes through a tunnel, opening in the underside of the wing just in front of the trailing edge.

Accommodation.—Two side-by-side seats midway between leading and trailing edges of wing, one on each side of airscrew drive.

Dimensions.—Span 30 ft. 6 in. (9.269 m.), Length 20 ft. (6.096 m.), Height 5 ft. (1.524 m.), Wing area 184 sq. ft. (17.1 sq. m.).

Weights and Loadings.—Weight empty 1,100 lbs. (500 kgs.), Weight loaded 1,690 lbs. (766 kgs.), Wing loading 9.2 lbs./sq. ft. (44.9 kgs./sq. m.), Power loading 21 lbs./h.p. (9.35 kgs./h.p.).

Performance.—No figures available. Makers claim the top speed to be 25 per cent. higher than conventional aircraft with similar engines.

MAKING ASSURANCE DOUBLY SURE.

(Contributed by the Bristol Aeroplane Co. Ltd.)

Up to the middle of 1928 the Bristol Aeroplane Co. Ltd., in accordance with the practice prevalent at that time with all high-class British aero-engines, had always recommended pure pharmaceutical castor oil, or Wakefield's Castrol "R," or a similar compounded oil, for the lubrication of Jupiter engines.

As these engines became more widely used in different parts of the world the importance of changing over to standardised brands of oil which could be readily obtained even in outlying regions became of considerable importance. In addition, the question of corrosion arising with vegetable oils, when engines are left standing for long periods or during transport, required consideration.

The Bristol Company decided, therefore, to do some serious experimental work to find out whether the Jupiter engine could be run satisfactorily in service on mineral oil or, alternatively, to find out what changes in design, etc., were necessary to make the engine satisfactory under these conditions.

From the outset it was decided to confine the experiments to accepted brands of straight mineral oil, leaving out all compounded oils, and very exhaustive programmes of tests, extending over fifteen months, under varying conditions, were made with different brands of oil.

In order to explain the matter fully, it should be stated that the experimental running referred to, including the flying tests, was made on engines which were not new, but had done some considerable amount of running on castor oil.

Various detailed minor modifications were made to the design of the engine, and as the tests went through with really extraordinarily little trouble it was decided to introduce these modifications on all engines after a certain date, and standardise the use of mineral oil.

As so often happens, in spite of careful preliminary experimental and research work, some trouble was experienced when the information was handed over to the production side.

It was found that whereas the old engines had taken kindly to certain brands of mineral oil, brand-new engines did not do so, and it was proved that there are certain circumstances under which a fatty oil will function better between two rubbing surfaces, and prove superior in preventing picking-up and adhesion than will a straight mineral oil. Further, castor oil is definitely superior in preventing the minute abraded metallic particles, such as occur in the running-in process, from re-welding to one another, or to other surfaces.

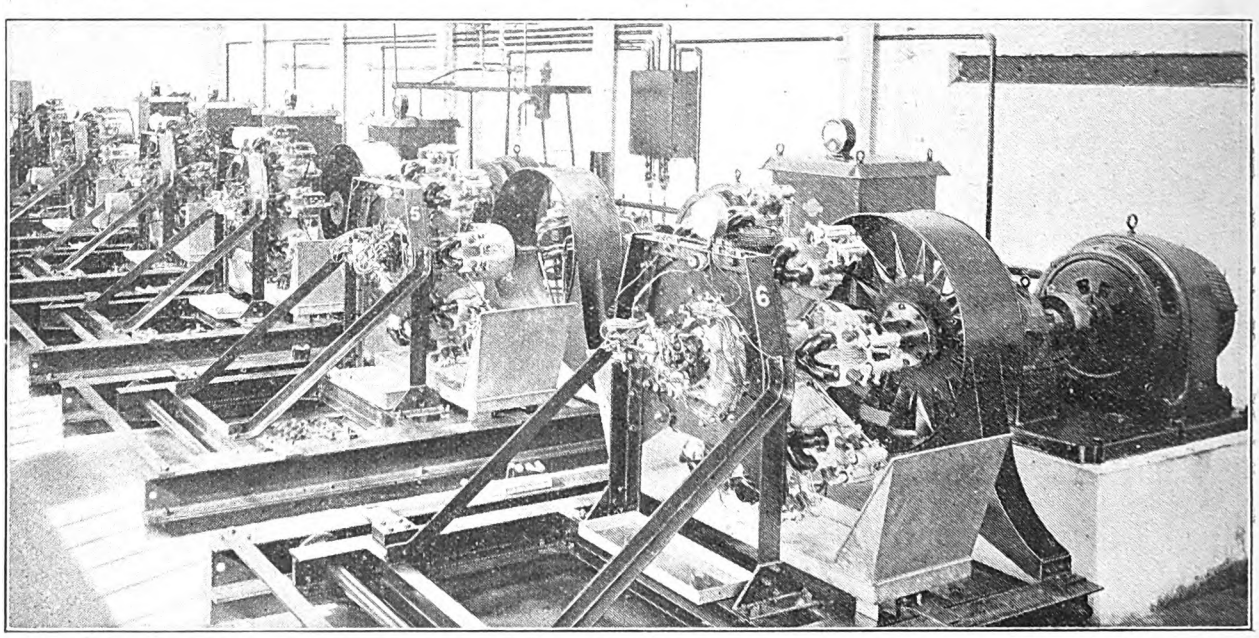
In view of this, further development work was done immediately, and it was found that by standardising a preliminary running-in process, using a special lubricating oil before the engines were run under their own power, these difficulties were eliminated.

To put the process upon a production basis, a specially equipped running-in department was laid down, capable of dealing with six engines at a time. Each stand was equipped with a 40 h.p. electric motor, driving the engine through a suitable reduction-gear unit.

All engines, after their first assembly, proceed to this department for a five hours' running-in period at 600 r.p.m., during which time a copious supply of a special oil is circulated freely through the engine from the oil-feed tank, in which the oil is maintained at a suitable temperature by means of electric immersion heaters.

The used oil from the engine is pumped into storage tanks and circulated through De Laval Centrifuges before return to the feed tank.

As the engine air-intake has an efficient air cleaner, and the rapid circulation of clean oil quickly removes any of those minute particles of foreign matter which find their way into an engine during the course of erection, the engine rubbing and bearing surfaces readily acquire that superfine finish which can only be obtained by a controlled running-in process. This means so much to the performance of the engine, particularly during the critical first few hours of its running life.



RUNNING THEM IN.—The new running-in shop at the Bristol engine works, where all new Jupiter engines are run for five hours by electric motors before being run on their own power.

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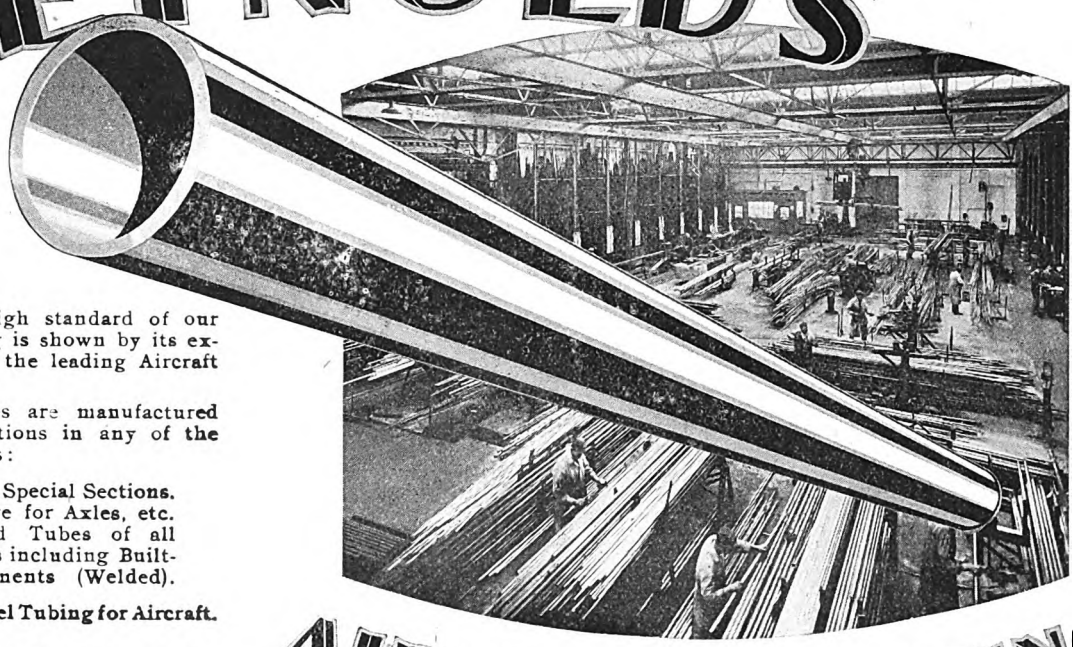

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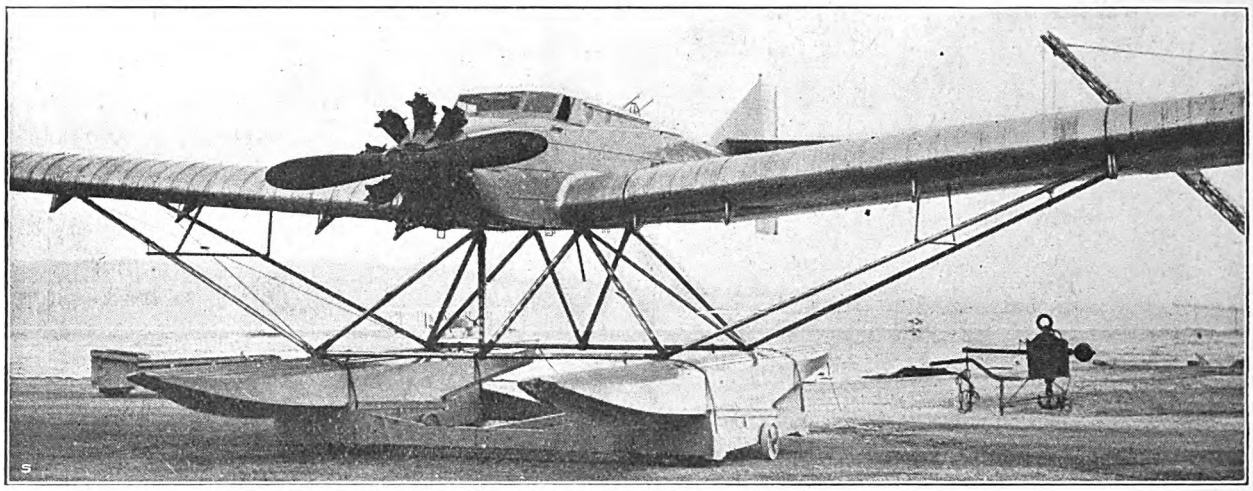
SOME RECENT AIRCRAFT.



The Villiers F.V.26 patrol and escort seaplane with Handley Page slots.

THE VILLIERS F.V.26.

Les Ateliers d'Aviation François Villiers, of Berre (Bouches-du-Rhône), are the French licensees of Handley Page slots.

In 1928 they built the F.V.24, a night fighter with slotted wings. This was described and illustrated in The Aeroplane for May 30, 1928. The F.V.24 was a two-seat sesquiplane with controlled slots and flaps along the whole of the top wing.

This firm has now completed the F.V.26 monoplane seaplane which has been designed for patrol and escort work. A craft of this kind must have a very slow cruising speed, a high top speed and big range.

For these reasons the new F.V.26 has Handley Page slots along the whole of the leading-edge of the wing. The inner halves of the leading-edge slots are inter-connected with trailing-edge flaps and are manually operated, but the outer sections, opposite the ailerons, are automatic. The makers claim for this machine a take-off of eleven seconds with the slots shut and of six seconds with the slots open.

As a result of the slot gear the F.V.26 is said to fly at the very large angle of 27 deg. incidence. At this angle it is claimed that the machine will cruise at 37 m.p.h. The top speed with the slots closed is 109 m.p.h.

Makers.—Ateliers Francois Villiers, Berre (Bouches-du-Rhône).

Type.—Twin-float seaplane for patrol and convoy work.

Wings.—Low-wing braced monoplane with slots and flaps along whole of span. Wing in two sections, each section being attached by steel fittings to bottom longerons of the fuselage. Two parallel streamline duralumin struts on each side brace the wings to the undercarriage. These struts are cross-braced with wire. Wing structure consists of two box-type spars and spruce ribs of Warren girder type. Drag bracing is by tubular struts and high-tensile steel swaged-rods. Covering is of fabric except at the wing roots, which have walk-ways of corrugated duralumin. The slots in front of the ailerons are automatic and open at 8 degrees incidence. The slots at inner section are interconnected with flaps along the trailing edge and are actuated by the pilot through a lever moving a worm and screw-gear. Ailerons have Avro type of balance.

Fuselage.—Wooden structure of rectangular section. The transverse frames, some which are box-type, are joined by four spruce longerons and various light stringers. The front portion of the fuselage to aft of the gunners' cockpit is covered with corrugated duralumin, the rest with plywood.

Tail Unit.—Normal monoplane type. Tail-plane adjustable in flight and has inverted Vee bracing from rear spar to fuselage. Rudder has horn balance below fuselage. Wooden structure similar to wing and is fabric covered except the fin, which is covered with plywood.

Undercarriage.—Twin single-step floats interconnected by two parallel cross-booms. These floats are attached to the fuselage by a system of streamline steel tube struts arranged in the form of an "N" when viewed from the side and in the form of an "M" when viewed from the front. The whole structure is rigid with no wire bracing. Wing bracing struts are also anchored to the float base as previously mentioned. The wooden floats are divided into water-tight compartments. They have a central keelson with two side keelsons, three main longerons and lighter stringers, all made of ash. The decking is of birch and the under-surface is made of triple mahogany planking with interposed varnished fabric.

Power Plant.—One 420 h.p. direct-drive Gnôme and Rhône Jupiter air-cooled radial engine. Duralumin engine-mounting. Detachable duralumin cowling. The fireproof bulkhead has a large sliding door giving access from the pilot's cockpit to back of engine permitting adjustments to be made to magnetos or fuel systems in flight. Oil tank is aft of fireproof bulkhead. Two duralumin fuel tanks in wing with a total capacity of 630 litres (138 galls.). Fuel tanks have emergency dumping device and are easily removable. Viet starter fitted.

Accommodation.—The pilot's cockpit seats two side-by-side above the leading edge of the wing and is totally enclosed. Cabin has sliding glass panels and emergency exit in roof. Dual control is not removable. Access to rear of fuselage through door at back of cockpit. Behind cockpit is compartment for navigator lit by circular portholes in sides and trap door in roof. Aft of navigator's compartment is the wireless compartment. Above trailing edge of wing is gunner's cockpit arranged for firing vertically downwards through cut-outs in the wings. Two 50 kg. (110 lb.) bombs are carried.

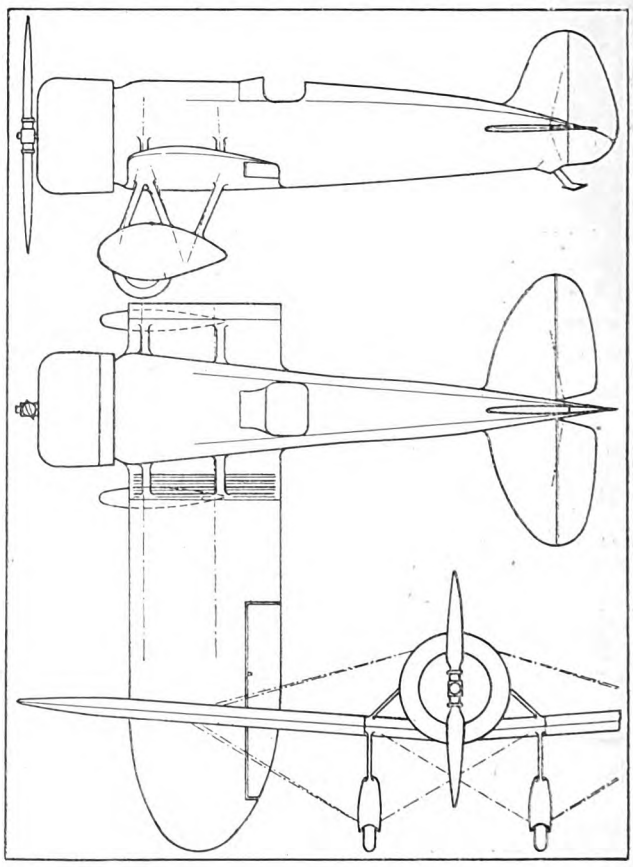
Dimensions.—Span 21.92 m. (71 ft. 11 in.), Chord 3.20 m. (10 ft. 6 in.), Length 12.705 m. (41 ft. 8 in.), Height 4.78 m. (15 ft. 8 in.), Wing area 66 sq. m. (710 sq. ft.).

Weights and Loadings.—Weight empty 1,820 kgs. (4,020 lbs.), Disposable load 980 kgs. (2,160 lbs.), Useful load 500 kgs. (1,100 lbs.), Weight of fuel and oil 480 kgs. (1,060 lbs.), Weight load 2,800 lbs. (6,180 lbs.), Wing loading 42.4 kgs./sq. m. (8.7 lbs./sq. ft.), Power loading 6.66 kgs./sq. m. (14.7 lbs./sq. ft.).

Performance (Estimated).—Speed, maximum, 175 km.hr. (109 m.p.hr.), Cruising speed 60 km.hr. (37 m.p.hr.), Landing speed 55 km.hr. (34.2 m.p.hr.), Ceiling 6,000 m. (19,700 ft.), Range at cruising speed 9 hours, Range with slots closed 850 km. (528 miles).

THE TRAVEL AIR MODEL "R" MONOPLANE.

The first Travel Air "R" low-wing monoplane was completed in August 1929. It was designed as a sporting or racing monoplane, and at its first appearance at the 1929



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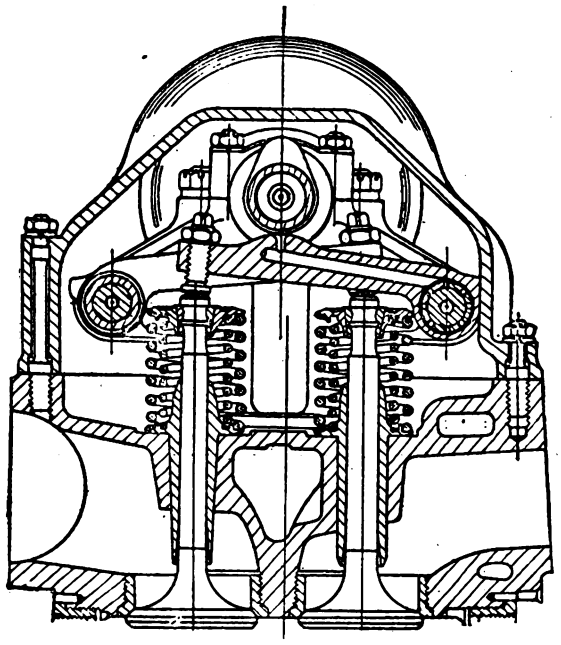

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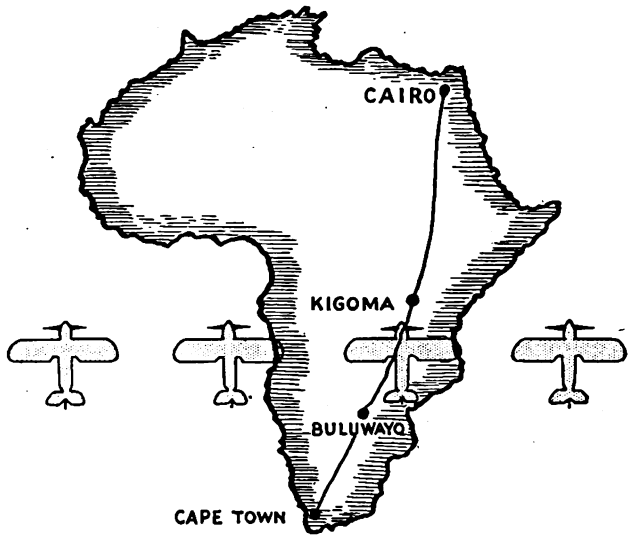
Reliability



4 WAPITIS

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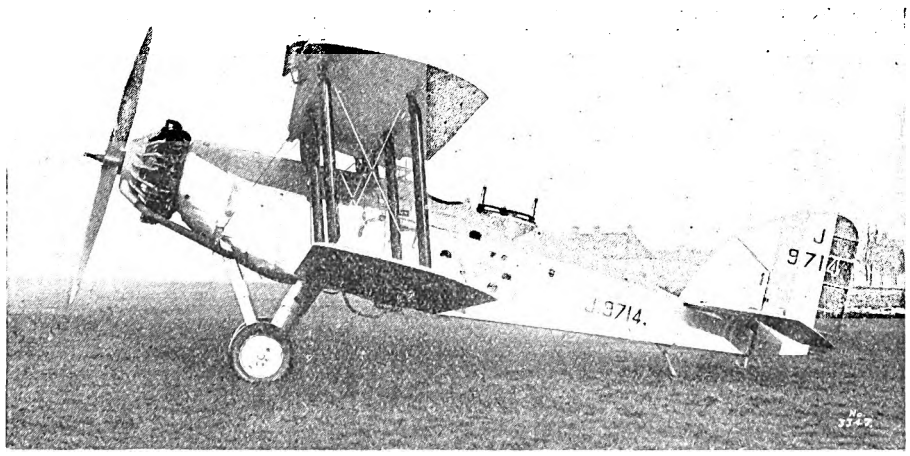
Sir Pierre Van Ryneveld.



The WAPITI is now constructed in the Union of South Africa under licence, with the BRISTOL JUPITER VIII Engine as standard, and a divided-axle undercarriage for use on African Aerodromes.

As supplied to the Royal Air Force, Royal Australian Air Force, etc., etc.

WESTLAND AIRCRAFT WORKS

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YEOVIL, ENGLAND.

Telegrams: Aircraft 141 Yeovil. *Telephone: Yeovil 141*

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It is not until he takes completely to the air that the business man of widely scattered interests realises how restricted he was by his dependence on public transport. The possession of an Avro Five sweeps these difficulties away and brings the whole world to his doorstep. He finds that Hamburg is not very much further from his London office than Hampstead! In the comfort and safety of this three-engined monoplane he can travel at any time to any place and be back again before the man who goes by boats and trains has even got there!

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A. V. Roe & Co. Ltd., 166 Piccadilly, London, W.1. *Works:* Newton Heath, Manchester and Hamble, Southampton

The sole English distributors for the Avian light aeroplane are Henlys (1928) Ltd., Devonshire House, Piccadilly W.1

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THE LIGHT AEROPLANE
AND THE FLYING CLUBS.

INDIA TO ENGLAND.

On Mar. 21 Mr. R. N. Chawla arrived at Croydon, shortly after noon. He was accompanied by Mr. Adsley, as mechanic, son of Mr. K. H. Irani, of Karachi, who provided the aeroplane. This was the final stage of the first flight made by an Indian pilot from India to England. The machine is a D.H. Gipsy-Moth.

Mr. Chawla and his companion left Karachi on Mar. 3, so they have done the journey in eighteen days. They were lost in fog over the Channel after leaving St. Quentin, and landed at Thetford, in Norfolk, whence they flew back to Croydon.

They were welcomed at Croydon by Mr. Bertram, representing Lord Thomson, Colonel Patterson, representing the Secretary of State for India, Dr. Quayle and Mr. Dutt, representing the High Commissioner for India, Captain Matthews, the Royal Aero Club, and Mr. Lewis (the Mayor of Croydon).

On Mar. 23 they were entertained at a reception by the Indian students at 21, Cromwell Road.

The Viceroy has sent Mr. Chawla a telegram, in which he says:—

I send you and Mr. Engineer my hearty congratulations on the successful accomplishment of the first flight by an Indian pilot from India to England.

The Director of Civil Aviation (in India) announces that the Governor-General has granted Mr. Chawla 7,500 rupees [about £560] in recognition of his achievement. Mr. Chawla's flight fulfilled all the conditions made for the Aga Khan's prize, except that he was accompanied by a passenger.

Mr. Chawla certainly put up a very fine show, and is to be congratulated especially on the way in which he has kept the flight to himself. There has been little notice taken in the Press of his flight, merely reports stating his arrival at the various stops *en route*. His only previous appearance in the public press was in his excellent flight from Karachi to Delhi and back.

There is considerable ethnological interest in this flight. Politically, Mr. Chawla is an Indian, but he is evidently not of the Dravidian or other aboriginal or indigenous stock which supplies the Babus and other objectionable or disturbing elements in the population of India. Mr. Chawla seems to be a Parsee, and the Parsees are just as much foreigners in India as are the English or the Pathans.

HINTS ON CLUB AIRCRAFT.

The following interesting notes on experiences with certain Moths and Cirrus engines have been kindly contributed by Mr. H. J. Halland, Chief Engineer of the Midland Aero Club:—

Engines:—3. Cirrus Mark I. Hours to date 2,560. 4. Cirrus Mark II. Hours to date 1,488.—Total 4,048.

Overhaul periods.—Top 120 hrs., complete 300 hrs.

Complete overhauls are done by the makers.

Daily inspection is as follows, if previous day's flying exceeds 1½ hours:—

Compression checked. Tappets checked and adjusted. Valve stems and rockers lubricated. Contact breakers checked Cylinder heads and induction pipe inspected for cracks. General inspection of installation.

Routine work after each 20 hours of flying:—

Sump drained and refilled with new oil. Clean plugs fitted. Contact breakers cleaned and adjusted. Distributors cleaned. Magnetos and impulse starter cleaned. Oil and petrol filters cleaned.

Remarks.—Forced landings owing to mechanical failure, two. (A) Broken valve rocker. (B) Stripping of magneto distributor gear.

The engines are run on mineral oil, and have nearly always been fully efficient up to the 120 hours. Much in excess of this is liable to result in burned valve-seats, which would need to be heavily recut or replaced.

Before doing any work on the heads they are tested for loose valve-seats by filling the exhaust and inlet ports with petrol and inspecting for leakage between the valve-seats and the head-casting.

The pistons are also carefully inspected for cracks round the gudgeon-pin bosses.

The engines are usually running well at the 300 hours and it would appear that the complete overhaul period might now be extended to at least 375 hours.

One engine, Cirrus Mark I, No. 6, has completed 1,062 hours' running since built, and is running as well as when new.

Aircraft;—Moths—Total hours to date 4,000.

Complete overhauls are done in most cases by the makers once each year for renewal of C. of A.

Daily inspections as follows:—All flying controls. Tail skid. Wing root fittings. Fabric, for tears. Raf-wires, for tightness and rusting. Undercarriage.

The wings are folded about every 30 hrs. and hinge-points and locking-bolts inspected.

Remarks.—Forced landings owing to mechanical failure 1, owing to breakage of R.H. lever on rear elevator rock-shaft. This put the R.H. elevator out of action. Though the machine was fully controllable in the air, it lacked sufficient elevator control to prevent landing on wheels.

The undercarriage buffer-struts need very little attention and need not be disturbed unless they show signs of needing lubrication; this is done with graphite grease, and it is an advantage to smear the inside of the cylinder slightly with oil before assembling, as this prevents grease from hardening after a short period of use.

When the machine is engaged on "landing dual" the tail-skid should be watched for chafing of the check-cable, and spring breakage, and cracking of the shoe. The fitting attaching the tops of the buffer-struts to the fuselage should

INDIA TO ENGLAND.—Mr. R. N. Chawla (right) and Mr. Adsley, Engineer, who have made, in a Gipsy-Moth, the first flight from India to England by subjects of the Indian Empire.

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be inspected after bad landings, and removed if damage is suspected. It may be found that the tierods through the fuselage are bent, and the holes in the longerons elongated.

The radius-rod lugs on the fuselage should also be inspected for movement. It also sometimes happens that a bad landing will cause splitting of the rear ends of the control-box sides.

On the wooden Moths short lengths of longeron may be inserted and fish-plated to the existing longerons.

ALL ABOUT THE COMPER SWIFT.

As reported in The Aeroplane for Mar. 19, Brian Lewis and C. D. Barnard Ltd., 30, Conduit Street, W.1, have been appointed sole concessionnaires in England south of a line from Gloucester to Ipswich for the Comper Swift. Their catalogue for this machine has just been issued, and everybody who is interested in this machine should apply to Brian Lewis and C. D. Barnard Ltd. for a free copy.

Rather a neat idea is the outline map on the first page, which has a stippled area south of the Gloucester-Ipswich line to shows the country covered by this firm.

The catalogue is well illustrated with pictures taken from The Aeroplane and other technical papers. Attention is drawn to the five outstanding features of the Swift: its exceptional visibility; the adjustable seat and pneumatic upholstery; its ease of maintenance (no rigging is necessary); the small housing space (any shed 19 feet by 9 feet is all that is required); and the ample baggage space.

Details of the performance and a full specification of the machine are given. The Swift has a 3 to 1 speed-range.

The catalogue also gives details of the Swift de Luxe, which costs another £50, making a price of £450.

For this increased price the purchaser gets a Fairey-Reed airscrew; an upholstered cockpit; compass streamlined and mounted in the centre section; a rear-view mirror; picketting gear; and waterproof cockpit cover. Various colour schemes will also be submitted to suit individual taste.

THE GIPSY II AND THE AIR MINISTRY TYPE-TEST.

Following on the successes of the 85-100 h.p. Gipsy engine, as used in Moths and nine other types of light aircraft in Great Britain and elsewhere, the De Havilland firm has now produced an engine on the same lines but developing 115-120 h.p., known as the "Gipsy Two." The extra power is got mainly by using a longer stroke. The refinements include an all-enclosed overhead valve-gear running in oil. Remarkable silence in operation is thus achieved.

Some few days ago this new Gipsy successfully passed its Air Ministry type-tests at the first attempt.

HENLYS' AIRCRAFT DEPARTMENT.

Henlys (1928) Ltd., the famous motor sales organisation, who are sole concessionnaires for the Avro Avian in England, report that their Aircraft Department is now operating, with headquarters at Heston Air Park. Mr. B. F. Allen is Manager of this new department.

Henlys are specialising in the Hermes Avian as a high-performance sports light aeroplane. They sold their demonstration model within three days of taking delivery.

THE LONDON AEROPLANE CLUB

A record for a day's flying time by the Club was set up on March 22 with a total of 29 hours 15 minutes.

A large number of members gathered at the Club House on Mar. 23 to witness the draw for the D.H. Gipsy-Moth raffled by the Club. The whole of the 1,500 tickets had been sold. The winning ticket was numbered 1026 and was taken by Lieut. Craig, of Westways, Totland Bay.

THE CHALLENGE INTERNATIONAL DE TOURISME.

Entries for the *Challenge International de Tourisme*, which takes place from July 20—August 7, and will be organised by the German Aero Club in Berlin, close on April 15, 1930. Late entries, at double entry fee, will be received up to May 15, 1930.

All inquiries concerning British competitors should be addressed to the Secretary, The Royal Aero Club, 3, Clifford Street, London, W.1.

THE EASTER PAGEANT AT LEICESTER.

The Leicestershire Aero Club are making every effort to ensure a really fine show at Desford on Easter Saturday, April 19. This ought to be very successful, as the R.A.F. have promised support, and about 30 machines have already made arrangements to be there.

Although the Pageant is fixed for Saturday, a number of visiting pilots will stay over the week-end, and at least five machines will be available throughout the holiday for members and their friends. Joy-riding will be provided by a professional school of flying during the same period.

The Club House and Enclosure are being extended, and the increased accommodation will be available for the Pageant. Mr. C. P. Hunter, of James Hunter and Co., Ltd., the well-known grass specialists and aerodrome constructors, has offered to level some ridges at Desford in time for the Pageant, and free of cost. These ridges were left when various hedges were pulled down. Mr. Hunter has recently acquired a Klemm, G-AATD, for his personal use.

TWO LIGHT AEROPLANE SPEED TROPHIES.

The *Aéro Club de France* has just published regulations for two new International Speed Trophies, one for landplanes and one for seaplanes.

Both Trophies will be competed for under similar rules, and both contests will be subject to a weight limitation. For landplanes the maximum empty weight will be 450 kgs. (990 lbs.), and for seaplanes the weight will be 560 kgs (1,232 lbs.).

The first landplane contest will be held in 1931, and the landplane and seaplane contests will be held on alternate years.

The *Aéro Club de France*, in announcing these Trophies, admits that considerable progress has resulted from the contest for the Gordon-Bennett, Deutsch de la Meuthe, Beaumont and Schneider Trophies, but states that the present high cost of racing aircraft of unlimited size and power makes the building of suitable aircraft without State aid very difficult for aircraft constructors.

The new formula should enlarge the field of entry and should at the same time contribute to the progress of speed flying.

GLIDING NOTES.

Gliding enthusiasts are reminded that the Inaugural Meeting of the British Gliding Association will be held at 18, John Street, Adelphi, W.C.2, at 18.30 hrs., on March 27.

This Association, although it does not yet legally exist, has done remarkably good work in raising money, prizes and machines for the gliding movement. Sir Sefton Brancker is President and Mr. L. Howard-Flanders the Hon. Secretary.

Everybody interested in the revival of gliding as a sport should make a point of being present at this meeting and giving the B.G.A. their personal support.

A glider has been built at Cramlington Aerodrome and has been put through its trials. This machine bears some resemblance to a Zogling but has a different arrangement of tail-booms.

Mr. Lowe Wylde and the Kent Gliding Club put up a sporting show over the weekend when they brought their glider from Maidstone to Aldbury to compete with the Zogling of the London Gliding Club which made its first hill-side trials during the same period.

On March 22 three or four *ab initio* pupils were launched successfully by the London Gliding Club. One says *ab initio* advisedly as two of them had never been in the air before.

The London Gliding Club requests pilots of aircraft to refrain from landing on their temporary gliding ground at Aldbury, near Tring, which is the property of the National Trust. The use of this ground for such a purpose is specifically forbidden. The Club, however, hopes to be able, in the near future, to make the necessary arrangements for the landing of visiting aircraft on adjoining property.

The Club very gracefully refrains from citing the case of the visiting aircraft which removed some of the farmer's wire fence.

A CRAMLINGTON AIRCRAFT.—Miss Constance Leathart on the Cramlington Glider.
(Photograph by R. Chadwick.)

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COMMERCIAL AERONAUTICS.

THE GUGGENHEIM COMPETITION CONTROVERSY.

In fairness to all concerned with the unfortunate controversy over the Guggenheim Safe Aeroplane Competition, the following letter from Mr. E. P. Warner, the Editor of *Aviation*, New York, who was one of the Judges of the competition, is published without comment:—

Dear Sir,—I have read with great interest and with considerable astonishment the story entitled "More About the Guggenheim Competition" on page 56 of your issue of Jan. 8. I recognise that it is very difficult to report such an event from a distance, and that it is equally difficult to secure a complete account from one whose responsibilities as a competitor lead him naturally to concentrate attention upon his own machine rather than upon its rivals. As Mr. Handley Page unfortunately had to leave the United States before the competition had been completed, his own information about its latter stages, information upon which I gather your account was based, must in some degree have been second-hand.

As I have previously indicated, I fully realise that misapprehensions are natural under these circumstances, and I should not think them worthy of notice, human nature being fallible, and that of press men (as I am now having the opportunity of learning for myself) no less so than for the rest of the World, were it not for the great importance of the event, for its international aspect, and for the weight which your own judgments upon aeronautical affairs command.

Under the circumstances as they exist, it seems to me to be exceedingly undesirable that any mistaken impression should be allowed to remain, or that English readers should be misled about the competition or the spirit in which it was conducted. I therefore undertake to analyse your observations in detail, and to request the courtesy of your pages for at least a substantial part of the resultant product.

Perhaps I may recall to your mind that I had a dual connection with the competition, as one of the judges and also as a member of your own profession who had reason to follow events at Mitchel Field closely and to insure a proper report in each issue of his journal. I have not depended solely upon my own contact with the event, however, but have been at some pains to consult with the test pilots, observers, technical advisers and other officials as far as they can be reached. I have done my utmost, in other words, to insure my own declaration upon the competition's history against appreciable error.

Following upon this prolonged introduction, I turn to the first of the allegations of apparent unfairness, or at least of slackness in the administration of the contest. Your account says:—

"The day before the last fixed on which the competing machines could arrive at the field without being disqualified the Handley Page was the only machine on the spot. All the other European entries had been cancelled and none of the American entries had arrived, which only shows that the Americans like ourselves have the habit of procrastination and of finishing their machines on the starting line. Faced with the position that this world advertised competition looked like being a fiasco except for the one English entry, the committee evidently relaxed the most essential rule, namely that if a machine was not ready in time it must be put out. Consequently a number of aeroplanes which arrived a few days late were allowed to have a try at the qualifying tests, and one was actually allowed to put in an appearance on Nov. 18."

Perhaps the best answer that I can make to this will be a quotation from the story of the progress of the competition which appeared in *Aviation* for Nov. 16, some weeks before there was any decision as to the winner or any controversy, either legal or technical, either domestic or international:—

"Entering the last week of October no planes other than those mentioned had been officially presented, although the Curtiss Tanager was known to have been flying regularly, undergoing tuning up trials at a near-by field. With about four days to go, things began to happen. The Curtiss was flown to Mitchel Field and officially turned over. The Commandaire arrived by air, as did the Fleet. The Schroeder-Wentworth, which had never yet been in the air, came in by express from Hammondsport."

The actual fact is that every machine which had the slightest chance of figuring in the final award, as the event proved, was on hand by Oct. 31, the closing day. It is true that in one or two cases planes were removed from the field and returned to their own hangars on neighbouring fields, pending the time when weather conditions, availability of instruments, and other attendant phenomena would permit of the giving of the tests.

In at least one case the removal was at the suggestion of the officials, as the hangars at Mitchel Field were badly crowded, and there seemed no reason for keeping the machine there after it had been formally submitted and declared ready for test rather than returning it to its own hangar three or four miles away until the officials should be ready to proceed with it.

So far as the specific statement that none of the American entries had arrived at the time of the Handley Page's appearance is concerned, the records show that two planes had been submitted and had undergone certain trials before the Handley Page had arrived in the United States, one of them having already been formally eliminated for a failure in some of the tests and the other still being under tentative consideration.

There was one actual relaxation of the rules affecting time of arrival, and there was one special decision affecting a particular machine, but in no way influencing the chances of victory of any of the other entrants.

The weather during the last week in October was exceedingly bad, so bad that the Russian plane engaged in flying from Moscow to New York was delayed for a number of days in completing the last five hundred miles of its journey. As several of the contestants had intended to come in by air, the officials felt it obviously in the spirit of the rules to permit any machine which had been ready to start by Oct. 31 and had made a sincere effort to do so, to come in as soon as the weather permitted. One entrant actually took advantage of that invitation and arrived two days late. A couple of others announced that they were going to do so but in point of fact they never showed up.

The special waiver applied to the plane mentioned in your article as having appeared on Nov. 18. That machine had been badly delayed, owing to various accidents in the course of construction. As it appeared to have technical features of marked interest, it was decided that it should be allowed to participate in the trials for one of the "safety prizes," which it could win without excluding any one else from the opportunity of doing likewise, but that it would not be considered for the grand prize. It was not, therefore, in any true sense a competitor.

So much for that. Possibly this also disposes of the declaration "such alterations could not have happened if the competition had been run under the regulations of the *Fédération Aéronautique Internationale* instead of under purely American rules."

Neither I nor any of those with whom I have discussed the matter are able to conceive of any possible fashion in which the rules of the F.A.I. could have been applied to a competition so remote from the type of sporting event to which that body devotes its attention. It might equally well be suggested, it seems to me, that the F.A.I. rules should have been applied to the control of the R.A.F. competition for general purpose military planes a couple of years ago, or to any other event of a purely scientific, military, or commercial nature. Possibly, however, I misunderstand the point that it was intended should be made by that phrase.

It was further declared in your account of the event that the flaps on the Handley Page were automatic and those on the Curtiss manually controlled (which is of course the fact), that the Handley Page was, therefore, stable and the Curtiss unstable when the controls were turned loose in a dive, and that "this would have put the Curtiss machine out of the competition altogether, and so apparently to prevent the competition from shutting down forthwith, the Committee altered the rule to read that after diving the machine must right itself without the controls being handled,—*except those operating the safety devices.*"

In discussing this point, also, I am somewhat at a loss because of inability to imagine to what it can refer. There was no such change. There was no change of rule of any sort affecting the stability requirements. There was only one change of any of the rules and that, in so far as it could be said to have had any differential effect, operated more in the interest of the Handley Page than of the Curtiss entry. Of that more later.

It would, of course, have been absurd to permit the operation of the slot control during a free-control stability test. It would not only have been absurd, it would have been physically impracticable, as the flap control on the Curtiss, like most such auxiliary devices, is operated by a crank of rather short leverage and in a somewhat inconvenient position, so that it would have been quite impossible to jockey the flap with such rapidity as to counteract the deviations of the machine from the normal course.

As a matter of fact, the tests were run with the flaps up on the Curtiss, since that position happened to be selected as a basic one, and also over the lower end of the speed range with flaps down.

In the opinion of at least one of the competition test-pilots the automatic operation of the slots on the Handley Page entry was a point of definite danger, for when the machine was stalled and the controls released the nose dropped, the slots closed, and the flaps came up, whereafter a rather high speed of dive had to be obtained before the flight path would flatten out of its own accord, and the loss of altitude would be correspondingly great. On the Curtiss under the same circumstances the manually controlled flaps stayed down, and the speed required for a regained equilibrium and recovery from the dive was correspondingly reduced.

Upon the suggestion that the members of the Committee are open to charges of various degrees of infamy or of nationalistic bias, and upon the suggestion that they displayed weakness of character, I forbear to comment. If it is not considered that any of the officials engaged in the competition have reputations which are capable of speaking for them, perhaps the facts here recited will modulate if they do not dispose of the criticisms of the conduct of the judges, technical advisers, and others concerned.

There followed a disquisition upon the etymology of the word fiasco. There I hesitatingly defer to your superior erudition. What it leads up to, however, is the suggestion that the officials were in a certain state of panic, lest the competition be left with no winner if no machine succeeded in passing the preliminary safety test.

That would have been a rather unfortunate result, as I am sure you will agree, but it would not for a moment have justified in the mind of any member of the official group the falsification of results or the camouflaged modification of rules in the interest of one competitor. In point of fact, as I have previously indicated, one rule was modified. The requirements as originally drafted provided that a competing plane must show a minimum angle of glide of not more than eight degrees to the horizontal, and also that it must be able to glide at an angle of at least sixteen degrees (of course in still air) and at a steady speed not in excess of 45 m.p.h.

This figure was hardly even backed by theoretical investigation. It is obviously desirable to be able to bring a safe and controllable plane in to landing in a stalled glide, and when the requirements were first drafted the 16-degree figure seemed a very modest one. Tests, however, promptly revealed that the general impressions of

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more or less experienced pilots and flight test personnel, had been very misleading in that particular, and that as a matter of fact the condition was difficult to the point of impossibility,—at least without the fitting of some form of air brakes which no plane in the contest had.

The actual maximum angle of glide was measured as 12.8 degrees for the Handley Page and 13.2 degrees for the Curtiss. The Tanager therefore came a little the nearer to meeting the stipulation. It was decided by those responsible that it would be manifestly out of accord with the spirit of the competition and both unfair to the competitors and misleading to the public to throw out all contestants with so comparatively minor a requirement, and the figure of 16 degrees was accordingly reduced to 12, allowing both of the two machines which had previously shown enough promise to justify the making of the complete series of tests to pass unscathed.

The next point pertained to the elimination of the Handley Page machine for failure to meet the minimum gliding speed requirements. In that connection, you say, "on all points the Handley Page seems to have beaten the Curtiss, with the solitary exception of the slow gliding speed, which was one of the most essential tests in the competition."

"Seems to have" is a very saving phrase. As a matter of fact, as the official report shows, the Curtiss Tanager was superior to its principal rival not only in minimum gliding speed but in minimum speed with power, in maximum angle of glide and in minimum angle of glide, in landing over an obstruction, and according to the prevailing impression of the pilots in stability and control. The Handley Page had a shorter landing run after getting onto the ground, but a longer landing over the obstruction, which corresponds more nearly to practical conditions, presumably partly because of its less steep stalled glide and, partly because of a less rugged undercarriage, which did not permit of its being flown into the ground with as heavy a wallop as the Tanager could accept with equanimity.

I need not recount in detail the history of the measurements of gliding speed, upon which your article throws considerable aspersions with a declaration that the standard Pitot-tube type of air speed meter showed less than 38 m.p.h., but that an air-log showed more. No one acquainted with modern flight testing methods would seriously suggest that so important a measurement be taken with a Pitot-tube rigidly mounted in immediate proximity to the wings.

The standard instrument actually used for basic indications was a trailing-bomb type of Pitot, suspended by cables far enough below the plane to make interference immeasurably small. The quotation from a "R.A.F. pilot of great experience" to the effect that interference is present when a trailing-bomb air-speed meter is used can hardly be argued. Neither at Martlesham Heath nor in the United States is there any mystery about the nature and magnitude of these interferences.

It is quite true that in the early stages of the work one of the instruments was very defective and the needle stuck. The discovery of that fact was followed by a general overhauling of the instrumental equipment which was repeatedly checked and calibrated, and I think it is safe to say that it was free from any ground for criticism during the entire period in which the final measurements on the Handley Page and Curtiss were being taken.

It was also indicated that tests at Martlesham had shown a gliding speed of just under 38 m.p.h. on the Handley Page, with the implication that there is reason to look for something wrong in the American test which failed to produce the same result.

The work done at Martlesham Heath is regarded with the greatest respect and admiration in this country, but so is that done in various American laboratories, and indeed the fundamental practices and precautions in flight testing are very similar in the two countries. Without knowing more of the precise conditions under which the machine was flown at Martlesham Heath, it would be impossible to comment upon the difference between the performance made there and that recorded in America.

Of course it is possible, although I admit that it does not seem entirely likely, that the machine suffered a sea change, a distortion of aerofoil form sufficient to make a measurable difference in minimum gliding speed. However that may be, the plane was not eliminated from consideration until it had been given every conceivable chance of justifying itself. It was flown through the same test by all three of the competition test pilots, and the results obtained on minimum gliding speed checked with amazing accuracy, generally lying quite consistently within half a mile an hour of the average figure, which was a little more than one m.p.h. above the required minimum.

After the Fund's test pilots had done their best, Major Cordes, Mr. Handley Page's representative at Mitchel Field, was invited to try his own hand, and although, according to the best reports that I could secure, he was able to secure a fractionally lower gliding speed for a brief interval (still not down to 38 m.p.h.) the best that he could hold for any appreciable time, in accordance with the rule that the minimum gliding speed must be sustained for three minutes, was in almost exact agreement with the figures of the American pilots. Finally, Major Cordes was asked if there was anything he could suggest that would enable the machine to make a better showing, or anything more that should in justice be tried, and it is my understanding that he had nothing more to propose and was apparently satisfied.

With your remark that "the Handley Page machine put up an extraordinarily fine performance" I can heartily concur. The same was true of the Curtiss Tanager, and under the rules of the competition the Curtiss performance happens to have been a little finer. Some of the performances which you quote, are, however, a little misleading, since all landing and take-off distances were of course required to be reduced to a perfect calm. Under those conditions the Handley Page ran 85 feet, not 21 yards, after landing, and took off in 290 feet, not 240.

It was suggested in your account that there may have been something fantastic about the rated power of the Curtiss engine. I am not attempting to investigate that point in detail. Suffice it to say that calibrated tachometers were in use, and that r.p.m. were recorded and that engines were held to their rated figures. Furthermore, I see no reason why the Curtiss should be more subject to suspicion than the Handley Page in that particular.

Maximum speed is ordinarily determined by the ratio of power-loading to wing-loading, general cleanness of design being assumed approximately constant, and that figure, according to the wing-loading and power-loading as stated by yourself, was .522 for the Curtiss and .536 for the Handley Page. Against a very minute handicap in this particular, the Curtiss had the opportunity to gain some advantage by being a cabin machine with no excrescences on the body.

I come at last to my closing point, the status of slots in the competition. I happen to be a warm believer in slots myself, and I can thank British courtesy and hospitality for the chance accorded me, when I last visited you two years ago, to try personally a considerable number of slotted planes. Everything that I saw at that time, as well as before and since, has made me optimistic about the slot's ultimate prospect.

It is, however, quite misleading to suggest that the Curtiss and the Handley Page were "machines embodying the same main characteristics." They both had slots, and they both had adjustable stabilisers, elevators, and rudders, superposed wings braced together with wire, and wheeled undercarriages fitted with brakes. A very salient feature of the Curtiss entry, however, was the introduction of the floating aileron, which certainly produces some very remarkable effects.

No striking result can be obtained by any single device. Airplane design is not as simple as that. Since neither the slot nor any other single aerodynamic device can be guaranteed to wave the wand of Merlin over the craft, nor to be a sure means of exorcising all the little devils that inhabit it, we must judge the design as a completed whole and attribute the results to the completed and harmonious assembly of all the parts. The Curtiss Tanager was slot-cum-manually-controllable-flap-cum-floating ailerons-cum-a-whole-lot-of-other-things. It showed a brilliant general conception, and ingenuity and care in detail design. It bore the fruits of extended research. It won the competition by making the best showing under the rules as they were drawn,—and as they were drawn, so were they applied.

(Signed) E. P. WARNER.

New York, Feb. 6, 1930.

To this may be added the following letter from Major R. H. Mayo, who was the representative in Great Britain of the Guggenheim Fund:—

Dear Sir,—At the time when certain criticisms of the conduct of the Daniel Guggenheim Safe Aircraft Competition appeared I refrained from commenting on them as I had been one of the technical advisers in the Competition, but now that Mr. Edward P. Warner, one of the judges, has written you on the subject, it seems desirable that I should add a few comments. Having been present at many of the tests and had the fullest opportunities for studying the conduct of the competition by the officials, I am bound to say that Mr. Warner's analysis of the criticisms appear to me both just and accurate.

The criticisms were mainly in regard to acceptance of entries after the closing date, the alleged alteration of rules, and the suggestion that a certain test was not accurately carried out. Mr. Warner has pointed out that the somewhat generous interpretation of the requirement as to presentation of aircraft by Oct. 31 could have had no prejudicial effect on any competitor, and I will only add that no particular competitor suffered through modifications being permitted during the competition.

As to alterations in the rules there was one and one only, namely the relaxation in the requirement for steepest angle of glide. The original requirement was an arbitrary one and the relation from 16° to 12° cannot be said to have appreciably affected the standard of safety called for. Mr. Warner has shown that no individual competitor suffered by the change. I think it should also be mentioned that when the alteration was agreed upon it was only on condition that if any competitor succeeded in gliding at 16° the original requirement would have to stand.

Mr. Warner has dealt fully with the question of accuracy of measurement of minimum gliding speed. The difficulty of measuring these low speeds correctly is well appreciated on both sides of the Atlantic, and I can only say that it seemed to me that every precaution was taken.

It is a pity that these criticisms should have been made, as they have tended to obscure the value of the competition in bringing out the great advances made towards the attainment of safety in aircraft design.

The competition was really a triumph for the slotted wing, for although the winning aircraft had other interesting features which contributed towards its success, it must be generally admitted that both the winner and the runner-up depended mainly on the use of slotted wings. The disappointment felt in British aviation circles at the defeat of the Handley Page entry by a small margin should be tempered by satisfaction at this striking demonstration of the value of slotted wings.

(Signed) R. H. MAYO.

London, Feb. 24, 1930.

A HAMBURG—GALWAY AIR LINE.

In the House of Commons on Mar. 5, in reply to Lieut.-Commander Kenworthy, the Under-Secretary of State for Air said that he had no official information regarding a proposed Hamburg—Galway mail and passenger air line to be operated by a German Company by way of Hull, nor had the project been made the subject of an application from the German aviation authorities for the special permission which was necessary under the British-German air agreement of 1927 before such a service could be inaugurated.

No proposals had been received by the Air Ministry for the establishment of a British service on this route. He would point out that such a service could not be established without a subsidy and under the agreement with Imperial Airways it would have to be done by that Company. He imagined that the route did not commend itself to Imperial Airways as being commercially possible.

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THE INDIAN STATE AIR SERVICE.

In November, 1928, the Indian Government called for tenders for the operation of a subsidised air service to operate between Karachi and Delhi with an eventual extension to Calcutta.

The negotiations with the only company whose tender was generally acceptable proved abortive, and eventually the Government of India decided to organise the service as a Government undertaking.

The fact was recognised at the outset that there would be great practical value in securing the advantage of the experience of a regular air line company, and so the Government of India entered into an agreement with Imperial Airways Ltd. to charter one aeroplane for a weekly service between Karachi and Delhi. The agreement is for three years and the service, which was inaugurated on Dec. 30, 1929, is known as the Indian State Air Service.

The service is designed to connect with the east- and westbound England—India air mail at Karachi, and although a regular time-table exists, this is subject to variation to allow for the possible late arrival of the eastbound England—India aircraft at Karachi.

A RACE TO SAVE LIFE.

On the evening of Mar. 17, Dr. W. E. David had a message that one of his patients, Mrs. V. Marcus, was dangerously ill at Malaga, in Spain. He therefore got in touch with Dr. M. A. Cassidy, and then made arrangements with Imperial Airways to have a machine ready early next morning.

On Mar. 18, at 6.20 hrs., the two doctors left Croydon, two hours later they were in Paris and by 14.15 hrs. were in Biarritz. On Mar. 19 they flew to Madrid and reached Malaga by train the same evening.

Some time in 1919 a British aeroplane flew non-stop from London to Madrid, so passenger transport does not seem to have speeded-up noticeably in eleven years.

THE QUICKEST ROUTE.

On Mar. 17, Major H. W. Cundiff heard that his father, Sir William Cundiff, a former Lord Mayor of Manchester, was seriously ill with pneumonia at Monte Carlo. He therefore flew in a Northern Air Lines' machine to his home in Blackpool and collected his passport. He travelled by the night train to London and caught the first Imperial Airways machine for Paris.

He then took the Air Union connection to Marseille which he reached at 14.00 hrs. As no aircraft was available at Marseille he took the train to Monte Carlo. He saved eleven hours by using the air liner instead of the railway. The latest news reports that Sir William Cundiff is better.

CUSTOMS AERODROMES.

In the House of Commons on March 20 in reply to a question by Mr. Day, the Under Secretary of State for Air said that the following customs aerodromes had been approved during the year ending January 31 last, Southampton, Hounslow (Heston), Liverpool and Manchester. Arrangements for the Customs clearance of passenger traffic had been made at Southampton, Liverpool and Dover.

THE RIGHT WAY.

A night air service between Brussels and London is to be opened on April 14. *Until further arrangements are made mails will be carried without surcharge.*

Sabena are to be congratulated on going about the job in the proper way. On the other hand, no air transport company can play the philanthropist, so one hopes that this demonstration will convince the responsible postal authorities that this is the right way to despatch mail.

BY ERROR.

In the report of the Discussion which followed Mr. Rowledge's paper on Water-Cooled Aero Engines and was reported in THE AEROPLANE for Mar. 5, Major Bulman was reported as saying:—

> We could not expect these large horse-powers to be available for immediate use though they might be available for Service use in two years.

Major Bulman wishes to draw attention to the views he expressed as recorded in the official verbatim report wherein he says that we should be ill-advised to look for anything more than, say, 1,000 h.p. in two years from this engine as a normal Service type.

THE AMERICAN CIRRUS ENSIGN ENGINE.

American Cirrus Engines, Inc., of Marysville, Mich., U.S.A., are producing an inverted version of the American Cirrus engine, to be known as the Ensign. This engine will give 95 h.p. at 2,100 r.p.m. and will weigh 273 lbs.

Little is known about this engine, but as far as can be gathered, it will differ from the Cirrus III only in those respects which require modification by the inversion. The wet sump is replaced by a top cover and lubrication is by two pumps from separate oil tanks.

OIL FOR GENETS.

Mobiloil was used by M. Albert (Armstrong Siddeley Genet) when he broke the World's Altitude Record for Light Aeroplanes of the Third Category (771.6 lbs.).

THE LONDON TERMINAL AERODROME.

ANALYSIS OF FIGURES FOR PAST WEEK.

Trips per Day.—Sunday, 7; Monday, 17; Tuesday, 18; Wednesday, 12; Thursday, 19; Friday, 21; Saturday, 19.

IMPERIAL AIRWAYS LTD.:

London—Egypt—India: London—Le Touquet—Paris—Basle—Zurich: London—Ostend—Brussels—Cologne and return: Machines 35, passengers 267, freight 16¼ tons. India Route: Inward, passengers 0, mail 602 lbs.; outward, passengers 0, mail 710 lbs.

AIR UNION:

Paris—London: Machines 34, passengers 83, freight 8¼ tons.

K.L.M.:

Amsterdam—Rotterdam—London: Machines 12, passengers 37, freight 6¼ tons.

SABENA:

Brussels—London: Machines 17, passengers 19, freight 2¼ tons.

DEUTSCHE LUFT HANSA A.G.:

Amsterdam—London: Machines 12, passengers 29, freight 1¼ tons.

MISCELLANEOUS:

British machines 3, passengers 2.

Foreign machines 0, passengers 0.

Total number of trips by British machines, 38, carrying 269 passengers. Foreign machines, 75, carrying 168 passengers.

COMPARATIVE FIGURES.

Week ending Mar. 22:
Machines, 113; Passengers, 437; Crews, 291; Total personnel, 728.
Corresponding week, 1929:
Machines, 142; Passengers, 692; Crews, 234; Total personnel, 836.
Corresponding week, 1928:
Machines, 115; Passengers, 496; Crews, 225; Total personnel, 721.
Corresponding week, 1927:
Machines, 78; Passengers, 302; Crews, 130; Total personnel, 432.
Corresponding week, 1926:
Machines, 78; Passengers, 285; Crews, 100; Total personnel, 385.
Corresponding week, 1925:
Machines, 89; Passengers, 259; Crews, 105; Total personnel, 364.
Corresponding week, 1924:
Machines, 58; Passengers, 134; Crews, 100; Total personnel, 234.
Corresponding week, 1923:
Machines, 85; Passengers, 371; Crews, 156; Total personnel, 527.
Corresponding week, 1922:
Machines, 66; Passengers, 177; Crews, 105; Total personnel, 282.
Corresponding week, 1921:
Machines, 48; Passengers, 162; Crews, 60; Total personnel, 222.

CROYDON NOTES.

The Mayor of Croydon, who always warmly supports Croydon Aerodrome, spent a long and unprofitable afternoon awaiting Mr. Chawla, the Indian pilot, who flew a Moth from India to England, but who unfortunately landed at Thetford instead of Croydon. Quite undeterred, Mr. Mayor turned up again when the Indian really did land.

There were new corns in Egypt not long ago when a certain gentleman was pursued about thirty times round and round in the middle of the Aerodrome by his own Avian, of which he had set the throttle wide open before climbing out to restart his prop. If he had not grabbed the wing-tip and kept on waltzing with the machine it would infallibly have spoiled the Egyptian.

Mr. Rogers, of Imperial Airways Ltd., has a steady record of ten years' flying in British Civil Air Lines, and save for such periods when there has been no British Aviation for short spaces, he has never let up. He looks remarkably well and handsome on it, and we wish him the odd twenty or thirty years more flying before he retires. His log-book ought to make a useful history of Civil Aviation.

There is a movement on foot to make aerial traffic control much more like that of the roads. After a glance at the various firms' time tables for the coming summer, one cannot but realise that the Air Ministry will really have to take the matter in hand, and it is gratifying that this is now being done. Amongst other things a Northern and a Southern route, to be used by aircraft flying to the North or South, has been suggested. K.L.M., Luft Hansa and Sabena would use the North route only, and Air Union and Imperial Airways the Southern.

The above notes are full of all sorts of snags and discrepancies, which we pray the reader to forgive. The writer's civil disobedience in the matter of loud speakers has been visited with punishment in the nature of a tertian ague, a complete set of megrims and a dose of flu.

The old pipe tastes like an incinerator full of second-hand goloshes, the mercury shoots out at the top with a pop when they try to take our temperature, red-hot centipedes with cold feet run races up and down the spine and we know at last what it is to have bumble bees in the cranial cavity. Apart from these we are very well, thank you.—SPRY.

LINED BEARINGS.

The Hoyt Metal Co., of Great Britain, Ltd., have just produced a very interesting booklet on lined bearings for various branches of engineering. The book gives directions for using Hoyt Metals, hints on lining bearings, a description and use of the firm's metals, and other useful data.

Notes on aviation bearings are included, as well as the uses of Number Eleven Metal for aircraft engines. Copies of the booklet, which is well illustrated, can be obtained from the firm's office at Deodar Road, Putney, S.W.15.

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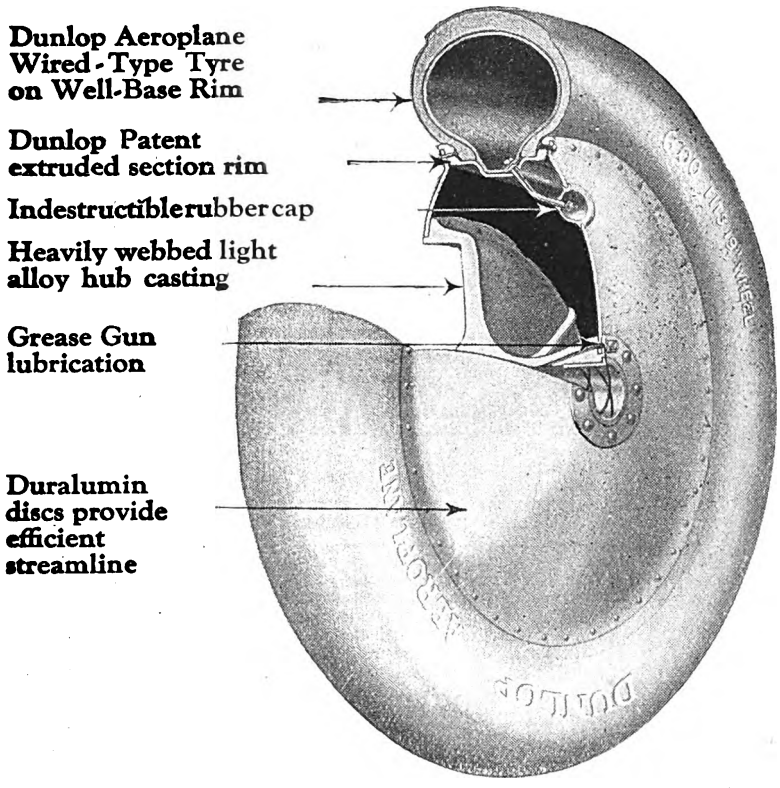

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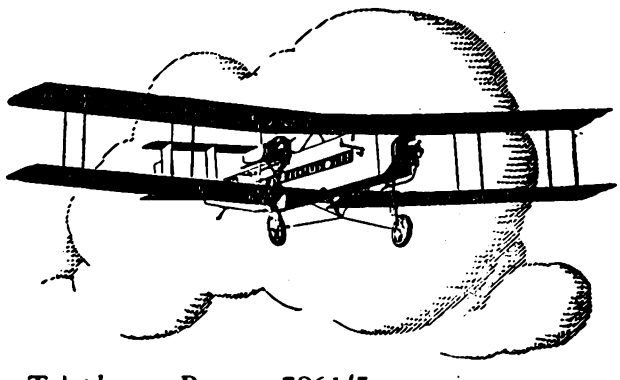

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A COURSE AND WIND CALCULATOR.

The Addison Luard Course and Wind Calculator, Type B, is intended to solve the various trigonometrical problems of aerial navigation. The instrument is extremely simple and the operations are performed automatically.

The instrument consists of a circular base on which are three radial arms, each of which has a cursor, or slider, with a pantagraph link between the cursors. The arms represent the air course, track, and wind, respectively, and are graduated in units of miles per hour. Degree graduations of from 0° to 360° are engraved on the base. The air course arm carries the air speed cursor, the track arm the ground speed cursor, and the wind arm the wind speed cursor, and clamping levers lock each arm as required.

To operate the instrument it is merely necessary to set on the appropriate scales the values of the known quantities, either air speed, wind speed, or air course, and the required values can then be read off immediately without further manipulation or calculation.

The Type C. Calculator carries two extra parts, an auxiliary air course arm, and an auxiliary drift scale. Smith's Aircraft Instruments are the distributors, and the calculators are priced at £10 10s. for the Type B, and £21 for Type C.—M. S.

A NOTABLE ADDITION.

His many friends in the Aircraft Industry will be glad to hear that Flt. Lt. R. H. Stocken, late R.F.C., and R.A.F., and now Reserve of Air Force Officers, has joined the Staff of the De Havilland Aircraft Co. Ltd., as personal assistant to Mr. F. T. Hearle, General Manager of the firm.

Although Flt. Lt. Stocken only became publicly known as a first-class pilot after the War he has had a vast amount of Service and business experience. In 1912 he joined the City of London Imperial Yeomanry Rough Riders as a trooper, and served with his regiment in the Dardanelles, Egypt and Gallipoli. He was wounded on the Gallipoli Peninsula in September, 1915.

In March, 1916, he was given a commission in the R.F.C. and served in France with No. 21 and No. 23 Fighter Squadrons, and was mentioned in Despatches. In 1917 he qualified in Category A.1 at the famous Gosport School and was appointed Fighting Instructor at London Colney.

From February, 1918, to February, 1919, he was lent by the R.F.C. to the French *Service d'Aviation Militaire* to instruct their instructors in the Gosport method of training. He organised and commanded the Training Section at the French Army School at Chateauroux.

In February, 1919, he was appointed to No. 2 Communication Squadron at Buc, just outside Paris, on Peace Conference duties. He was one of the first British pilots to fly to Spain, whither he flew with Lt.-Col. W. D. Beatty, then at the Air Ministry, on special duty. Afterwards he was attached to the British Embassy in Paris as pilot and Assistant Air Attaché to Lieut.-Col. Sir Norman Leslie, until 1920, when he returned to civil life.

In 1923 he rejoined the R.A.F. as an instructor on the permanent staff of the C.F.S. at Upavon, and from 1925 to 1927 he served with the R.A.F. at Felixstowe, where he did experimental flying on Schneider Trophy machines. During this period he was also in charge of experimental deck-landing work on *H.M.S. Furious*, doing much of the experimental landing himself.

On the civil side Flt. Lt. Stocken's business career began in 1908 with Vigers Brothers, and from 1910 to 1912 he was in the Natal Bank. In 1913 he was in the Drawing Office of the London North Western Railway, and in 1913-14 he was studying French in Paris. Consequently he had a good business training before the War.

After leaving the R.A.F. in 1920 he was a pilot with the late Mr. Holt Thomas's firm, Air Transport and Travel Ltd. in 1920-21. And from 1921 to 1923 he was Chief Test and Delivery Pilot of the Aircraft Disposal Co. Ltd. at Croydon, during which time he delivered various types of war machines to Spain and Belgium and represented the firm in all the classic racing events.

On leaving the Air Force in 1927 he was appointed Assistant London representative to the Gloster Aircraft Co. Ltd., and acted as liaison officer between that firm and the R.A.F. squadrons and experimental stations where Gloster machines were used. This work naturally put him in close touch with all the departments of the Air Ministry and with various engine and accessory firms.

Incidentally while in the R.A.F. he was in charge of the instruction of officers of the French, Spanish, Greek, Swedish, Finnish, Chilean and Brazilian Flying Services.

Taking it all round he has had unusual Service and commercial experience. Both he and the De Havilland Co. are to be congratulated on the alliance.

THE A.I.D. DINNER.

The fifth annual A.I.D. Technical Staff Association Dinner will be held on May 2 at the Hotel Russell, W.C.1.—Time 6.30 p.m. for 7 p.m. Morning Dress. Tickets 10s. 6d. each.

A strictly limited number of tickets are available for those connected with the Aircraft Industry. Early application, accompanied by remittances, should be made to Mr. J. Jarvis, A.I.D., Room 749, Alexandra House, Kingsway, W.C.2.

NEW COMPANIES.

ERTIA TRUST LTD.—The directors at Dec. 31, 1929, were David G Hall, J.P., "Gwentland," Marine Parade, Penarth, Glam., shipowner. Cecil M. Boileau, 54, Fitzjames Avenue, W. Kensington, W.14, stockbroker. Wm. Luck, 1, Meadowcourt Road, S.E.3, company secretary. Secretary: Wm. Luck. Registered office: 19, Adam Street, Adelphi, W.C.2.

This firm is understood to be interested in building Klemm aircraft at a factory near Ipswich.

INTERNATIONAL AIRCRAFT.—International Aircraft Limited was registered as a "private" company on Mar. 19, with a nominal capital of £1,000 in £1 shares. The objects are to carry on the business of carriers of goods and passengers by air, instructors in aviation and owners of flying schools, proprietors and compilers of register of aircraft, aerial cinematographers, manufacturers of and dealers in aeroplanes, seaplanes, flying-boats, airships, balloons, etc. The subscribers (each with one share) are: L. Lawrence, 1, Threadneedle Street, E.C.2, clerk. V. C. M. Ludbrook, 76, Bishops Park Road, Norbury, S.W.16, clerk. The first directors are to be appointed by the subscribers. No qualification required. Remuneration as fixed by the company. Solicitors: Simmons and Simmons, 1, Threadneedle Street, E.C.2.

PERSONAL NOTICES.

DEATH.

SOPWITH.—On Mar. 24, at 32, Green Street, W.1, Beatrix, wife of T. O. M. Sopwith.

[His many friends in aviation will sympathise with Mr. Sopwith in the death of his wife. Mrs. Sopwith, who was the Honourable Beatrix Hore-Ruthven, was a daughter of the late Baron Ruthven, and a sister of the present Baron Ruthven, C.B., C.M.G., D.S.O., and of Brig.-Gen. Sir Alexander Hore-Ruthven, V.C., K.C.M.G., C.B., C.M.G., D.S.O., and of Colonel the Hon. Christian Hore-Ruthven, C.M.G., D.S.O. She married Mr. T. O. M. Sopwith in 1914. Her great personal charm and kindness of heart won for her many firm friends who will deeply mourn her loss.—C. G. G.]

MARRIAGE.

COHU—BOWLY.—On Mar. 22, Flt. Lt. J. M. Cohu, R.A.F., Peterhouse, College, Cambridge, to Barbara, only daughter of Mr. and Mrs. Bowly, Whyteleafe, Surrey.

FORTHCOMING MARRIAGES.

FLETCHER—BUTLER.—A marriage has been arranged, and will shortly take place, between Capt. W. F. Fletcher (late R.A.F.) and Doris Butler, M.B., Ch.B., daughter of Mr. J. G. Butler and Mrs. Butler, of Ecclesall, Sheffield.

HARDMAN—THOMPSON.—The engagement is announced Flt. Lt. James Donald Innes Hardman, elder surviving son of t. James Hardman, M.A., of Delph, Yorkshire, and Mrs. Hard: of Oxford, and Dorothy Ursula, elder daughter of Mr. and Mrs. Ash.roft Thompson, of Larkenshaw, Chobham.

MERTON.—KIRBY.—The engagement is announced between Mr. Walter Hugh Merton, R.A.F., elder son of Mr. and Mrs. Gerald Merton, and Bathshua Helen Beckford Kirby, only child of the late Henry John Alexander Kirby and Mrs. Kirby, of 46, Christ Church, Winchester.

VINES—FRANKS.—The engagement is announced between C... Pakenham Vines, R.A.F.O., and Mary, only daughter of Capt. and Mrs. G. A. Franks, of Chantries, Guildford.

WILLIAMS—CRESSY.—The engagement is announced between Capt. A. Williams, L.D.S., R.C.S., Eng., The Army Dental Corps (late attached R.A.F.), of Preston Barracks, Brighton, and Miss Laura Wheatley Cressy, of West Hove.

BIRTHS.

BAKER.—On Mar. 20, at Mayfly Lodge, Caterham, to Jamesie Derby, wife of Sq. Ldr. B. E. Baker—a daughter.

SHALES.—On Mar. 18, at Ismailia, Egypt, to Joan (*née* Williams Sanderstead), wife of Flt. Lt. F. H. Shales, R.A.F.—a son.

THOMSON.—On Mar. 10, at Grove House, Iver, Bucks, to Dorothy, wife of Sq. Ldr. T. C. Thomson—a son.

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Avian Cirrus II, all modifications; Mark IV undercarriage. C of A. August, £325.

D. W. Aircraft Co., Brooklands Aerodrome; have for sale several S.E.5as, reasonable figure, new condition with C. of A. Telephone, Byfleet 331.

For Sale, Gipsy Moth, 2-seater, as new. Box No. 5784, THE AEROPLANE, Cannon House, Pilgrim Street, E.C.4.

Henlys (1928) Ltd., Devonshire House, Piccadilly, W.1. Telephone, Grosvenor 2271. Sole Concessionnaires for the Avro Avian, for England. Authorised Moth Agents. Your car taken in part exchange, if desired. Deferred terms. Trade inquiries invited for Avian.

Joy-riding.—Le Rhone 504K Avro, Splendid condition. New March, 1929. Complete joy-riding outfit with good stock of machine and engine spares. Spare engine, field screens. Light Van. £200 or nearest. Bint, 181, Yardley Road, Acocks Green, Birmingham.

National Flying Services Ltd. (See page 545.) Quick deliveries. New or second-hand machines.

Phillips and Powis Aircraft (Reading) Ltd., have several used Mark II Moths for sale. Prices with C. of A. from £375. Reading Aerodrome—Sonning 114.

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